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Improving Teacher Competence in Implementing Deep Learning through Synchronous and Asynchronous Training with the Assistance of LMS in Tanjungpinang City

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Abstract. Teachers play a central role in improving the quality of learning in schools because the success of the educational process is fundamentally determined by the professionalism and competence of teachers. Therefore, teachers must be equipped with competencies to perform their main tasks and functions effectively and efficiently. The purpose of this Community Service (PKM) is to improve teacher competency through synchronous and asynchronous training assisted by a learning management system in Tanjungpinang City. This PKM was conducted from July to October 2025 involving 51 target teachers from 17 schools selected as target schools in Tanjungpinang City. Partners involved in this PKM consisted of the Ministry of Primary and Secondary Education, KGTK Kepulauan Riau Province, Tanjungpinang City Education Office. The results of this PKM can improve teacher competency as measured by the results of the pretest and posttest assessments which increased significantly. The results of this PKM contribute to the preparation of competent teachers to improve the quality of education in Tanjungpinang City. The results of this PKM also contribute to other parties who will carry out similar activities to optimally use the learning management system to improve the competency of teachers already serving in educational units.
Keyword: Teachers, Competence, Synchronous, Asynchronous Deep Learning

Abstrak. Guru memainkan peran sentral dalam meningkatkan kualitas pembelajaran di sekolah karena keberhasilan proses pendidikan pada dasarnya ditentukan oleh profesionalisme dan kompetensi guru. Oleh karena itu, guru harus dibekali dengan kompetensi untuk melaksanakan tugas dan fungsi utamanya secara efektif dan efisien. Tujuan dari Kegiatan Pengabdian Masyarakat (PKM) ini adalah untuk meningkatkan kompetensi guru melalui pelatihan sinkron dan asinkron yang dibantu oleh sistem manajemen pembelajaran di Kota Tanjungpinang. PKM ini dilaksanakan dari Juli hingga Oktober 2025 yang melibatkan 51 guru sasaran dari 17 sekolah yang dipilih sebagai sekolah sasaran di Kota Tanjungpinang. Mitra yang terlibat dalam PKM ini terdiri dari Kementerian Pendidikan Dasar dan Menengah, KGTK Provinsi Kepulauan Riau, dan Dinas Pendidikan Kota Tanjungpinang. Hasil PKM ini dapat meningkatkan kompetensi guru yang diukur dengan hasil penilaian pretest dan posttest yang meningkat secara signifikan. Hasil PKM ini berkontribusi pada persiapan guru yang kompeten untuk meningkatkan kualitas pendidikan di Kota Tanjungpinang. Hasil PKM ini juga berkontribusi kepada pihak lain yang akan melakukan kegiatan serupa untuk memanfaatkan sistem manajemen pembelajaran secara optimal guna meningkatkan kompetensi guru yang sudah bertugas di satuan pendidikan.
Kata kunci: Guru, Kompetensi, Sinkron, Asinkron, Deep Learning

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Introduction

Tanjungpinang City is a city in the Riau Islands Province and holds a strategic position both geographically and historically. Tanjungpinang City covers an area of approximately 239.50 km², consisting of 54.9% land and 49.1% sea. Geographically, Tanjungpinang is located on Bintan Island and serves as the administrative center of the Riau Kepulauan Province. Its location along international trade routes makes Tanjungpinang a region with significant economic, cultural, and tourism potential. Historically, Tanjungpinang is known as one of the centers of Malay civilization with close ties to the Riau-Lingga Sultanate, making this city rich in cultural heritage and local wisdom.

Teachers play a central role in improving the quality of learning in schools. Therefore, teachers must be equipped with the competencies to carry out their main tasks and functions effectively and efficiently. In schools, teachers serve not only as educators but also as role models, motivators, facilitators, and catalysts in the process of creating a learning environment that supports the growth of critical, creative, and innovative attitudes in students (Yasin & Adawiyah, 2022). Therefore, teachers are expected to bring about positive change to create a superior generation. To achieve this, teachers must improve their learning paradigm and keep up with student developments in accordance with the times to be able to bring positive changes to students' education. Similarly, Ikhlas (2020) explained that education in this era demands a paradigm shift from one-way learning to participatory, reflective, and transformative learning. Students need to be positioned as active subjects in the learning process, which is directed at understanding, connecting, and applying knowledge in real-world contexts. This reinforces the urgency of deep learning, where students do not simply memorize information but construct meaning, develop social-emotional skills, and develop character through an integrated process. Deep learning is a pedagogical model that aims to enhance student understanding through thorough exploration and critical engagement (Khairie et al., 2023). Findings from Biggs et al. (2022) indicate that this approach has been adopted in many countries, leading to significant improvements in conceptual understanding and active student participation. Deep learning in education is characterized by a process that enables learners to build a deep understanding of core concepts, connect knowledge across multiple subjects, and apply it effectively in real-world situations. To implement a deep learning approach in classroom learning, teachers must be competent in its application. Most teachers still lack competence in its application, especially in Tanjungpinang City. To produce quality students, teachers are required to possess strong competencies. Pedagogical competence, personality competence, professional competence, and social competence are the four basic competencies teachers must possess to carry out this responsibility (Nur & Fatonah, 2022; Sudrajat, 2020). Therefore, teacher quality needs to be improved because teacher competency currently needs to be integrated with the transformative and integrative direction of national education to achieve the national curriculum orientation with a Deep Learning approach.

Based on these issues, the Ministry of Education and the Tanjungpinang City Education Office are improving teacher competency through synchronous and asynchronous training modes assisted by a learning management system in Tanjungpinang City. To produce competent teachers, the program implemented is synchronous and asynchronous training modes assisted by a learning management system in Tanjungpinang City, involving the Ministry of Primary and Secondary Education, the KGTK of Riau Islands Province, and the

Tanjungpinang City Education Office. This training consists of independent learning stages through a learning management system. Previous research has revealed that training using a learning management system can improve training output (Jemadi et al., 2022; Lie et al., 2020). One solution that has been proven to increase efficiency and effectiveness in the education process is the use of a Learning Management System (LMS) (Kim & Lee, 2022). An LMS is an online platform that makes it easy to manage learning materials, facilitate interactions between lecturers and students, and provide various features that support more dynamic teaching. An LMS is crucial for implementing teaching support programs, particularly for evaluation (Saehana et al., 2021). Several previous studies have found that integrating technology into the teaching process increases student satisfaction and a desire to use technologies such as LMSs and mobile phones because they use them in their daily lives (Andriani et al., 2021). Another study by Atkinson and Lim (2021) showed that over 40% of teachers saved time checking student assignments. A study by Lie et al. (2020) found that despite the challenges of online teaching and learning, teachers remain committed to improving their practices and continuing to develop their professionalism.

Based on the explanation above, the important objective of implementing Community Service (PKM) is to improve teacher competency in implementing in-depth learning in Tanjungpinang City. Because if teachers have good competency, the expected performance will also be good, so that learning will achieve the desired goals and will result in quality education (Virgiyanti et al., 2023). This activity is crucial to support the Ministry of Primary and Secondary Education's program to improve teacher competency to create a superior generation. Thus, with the presence of competent teachers, Indonesian education can stimulate the achievement of Indonesia's demographic bonus towards a golden Indonesia in 2045.

Methodology

This Community Service (PKM) was conducted from July 26 to October 30, 2025, involving 51 teachers from 17 target schools. Partners involved in this PKM consisted of the Ministry of Primary and Secondary Education, KGTK of Riau Islands Province, and the Tanjungpinang City Education Office. The implementation of PKM was carried out through technical guidance (bimtek) activities for In-On-In Deep Learning, a training that combines face-to-face learning (In- Service Learning) and direct practice in the workplace (On-the-Job Training) in Tanjungpinang City. Bimtek for activities In 1 and In 2 was held at the BPMP Kepri building and for activities On was held at the participant's school who became a model teacher during OJT. To achieve the effectiveness and efficiency of this activity, the PM Training uses a flipped learning model, namely participants first learn independently online using an LMS, followed by offline face-to- face meetings. Online, participants access material in the form of reading materials and learning videos on the LMS. In face-to-face offline training, participants undertake various training activities to understand, apply, and reflect on the training outcomes. The face-to-face offline training consists of In-Service Learning 1 (IN-1), On-the-Job Training (ON), and In-Service Learning (IN-2) stages. The IN-1 stage includes various learning activities so that participants understand essential, applicable knowledge, values, and character. The ON stage includes applicative activities in real contexts so that participants apply the understanding gained during IN-1 in real contexts at school and/or work groups. The IN-2 stage includes reporting and presentation activities, sharing practices, as well

as reflection on the entire series of activities and follow-up after the PM training.

1. In-Service Learning Stage 1 (IN-1)

In this stage, participants receive material related to the Growth Mindset Module in PM; the PM Framework; Learning Principles and Experiences; Assessment in PM; Learning Planning; PM Implementation and Reflection; and Collaborative Inquiry. The IN-1 activity begins with participants learning independently online using the LMS, followed by face-to-face learning. The In-1 activity is held at the BPMP (Institutional Training and Development Agency) in the Riau Islands Province.

2. On-the-Job Training (ON) Stages

In On-the-Job Training (OJT) activities, PM training participants carry out RTL through collaborative inquiry activities at the Satmikal (Instruction Unit) in the form of (1) teaching in class/workgroups and being observed by other teachers as a form of good practice and providing mutual feedback; and (2) reflection, to improve learning strategies. Collaborative inquiry activities are accompanied by PM training instructors three times. On-the-Job mentoring activities are divided into three mentoring sessions. In mentoring session 1, the activities include orientation to mentoring activities; sharing the results of the implementation of learning facilitation in cycle 1; analyzing learning facilitation videos by selecting two videos of PM training participants' practices; providing feedback and follow-up mentoring. In mentoring session 2, the activities include preparation for open classes; open class 1 at the PM training participants' educational units (PM training participants are divided into 2-3 groups to act as observers); feedback from fellow participants and PM training instructors; and follow-up after mentoring session 2 (preparation for cycle 2). Mentoring 3 activities are orientation, mentoring activity 2 and preparation for open class; Open class 2 at the PM training participant's Educational Unit (PM training participants are divided into groups to become observers); Feedback from fellow participants and PM training teachers; Preparation for IN 2. This On activity is carried out at the open class model teacher's school.

3. In-Service Learning 2 (IN-2) Stages

The implementation of IN 2 activities includes evaluation of implementation results (ON); presentation of materials and sharing of practices with instructors and fellow participants; sharing of practices on implementation results with stakeholders; and reflection on the results of the sharing of practices. This activity was conducted at the BPMP (Regional Development Planning Agency) of the Riau Islands Province. The following is a scheme of learning activities in the Deep Learning (PM) training.

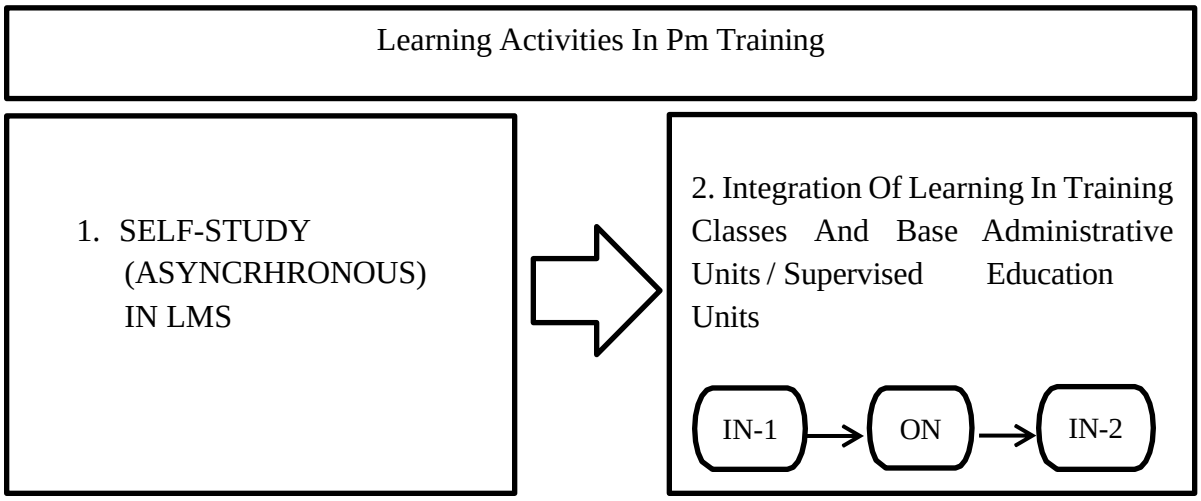

Figure 1. Deep Learning for Teachers

Results and Discussion

The purpose of this Community Service (PKM) is to improve teacher competency through synchronous and asynchronous training assisted by a learning management system (LMS) in Tanjungpinang City. This PKM was conducted from July to October 2025 involving 51 teachers from 17 schools selected as target schools in Tanjungpinang City. Partners involved in this PKM consisted of the Ministry of Primary and Secondary Education, KGTK Riau Islands Province, Tanjungpinang City Education Office. The results of this PKM can improve teacher competency as measured by the results of the pretest and posttest assessments which increased significantly. The results of this PKM contribute to the preparation of competent teachers to improve the quality of education in Tanjungpinang City.

During the training process, the teachers who participated in the training were enthusiastic and enthusiastic in participating in the training, this was evident from the presence of 100% of participants who were present throughout the activity. In addition, the participants were always present and went home on time according to the predetermined schedule and followed all the series of events properly by implementing the applicable rules according to the mutual agreement that had been agreed upon at the beginning of the activity. The level of participant participation during the activity was also good because during the activity process, around 80% of participants were always active in asking questions and providing responses related to the activity material, and around 95% of participants were always active during group discussions to complete the assignments given through the activity worksheets during the training. And 100% of participants completed the assignments and submitted them through the participant's LMS.

After this activity is completed, the expected objectives are that teachers are able to 1. apply a growth mindset to PM; 2. explain the concept and relationship of the learning framework, principles and learning experiences in PM; 3. analyze the application of PM principles and learning experiences in Videos and Teaching Modules; 4. design PM assessments; 5. prepare PM plans; 6. implement learning plans and reflect on learning implementation; and 7. design and implement collaborative inquiries in training study groups. The achievement of the expected activity objectives is measured from the results of the pretest and posttest assessments which have increased significantly. The following is a table of the

results of the implementation of PM activities in the form of the results of the participants' pre-test before the activity began and the results of the post-test after the activity was implemented.

Table 1. Pre-Test and Post-Test Scores of In-Depth Learning (PM) Participants in Tanjungpinang City

No	Participant Name	School Place of Service	Training Value		
			Pre Test	*Post Test*	*Average*
1	Vera Erli	State Junior High School 1 Tanjungpinang	70,2	86,8	78,5
2	Widi Kurniasih	State Junior High School 1 Tanjungpinang	76,9	90,1	83,5
3	Lia Nurika Midhas	State Junior High School 1 Tanjungpinang	70,3	86,8	78,6
4	Riska Haryanti	State Junior High School 2 Tanjungpinang	67,0	86,8	76,9
5	Septia Nurbaiti	State Junior High School 2 Tanjungpinang	86,8	93,4	90,1
6	Yunita Herdiana	State Junior High School 2 Tanjungpinang	80,2	90,1	85,2
7	Wenti Astanti	State Junior High School 4 Tanjungpinang	76,8	86,8	81,8
8	Ronal Priadi	State Junior High School 4 Tanjungpinang	73,6	70,3	71,9
9	Arliati Ika Putri	State Junior High School 4 Tanjungpinang	76,8	80,1	78,5
10	Jihan Kalingga Sari	State Junior High School 5 Tanjungpinang	67,0	90,1	78,6
11	Sarnika Putri	State Junior High School 5 Tanjungpinang	73,6	83,5	78,6
12	Merni Wati	State Junior High School 5 Tanjungpinang	53,7	86,8	70,2
13	Siti Nabilah	State Junior High School 6 Tanjungpinang	86,8	83,5	85,2
14	Paizal	State Junior High School 6 Tanjungpinang	53,7	86,8	70,3

15	Catur Purwanto	State Junior High School 6 Tanjungpinang	66,8	83,5	75,2
16	Aida Rahmadani	State Junior High School 7 Tanjungpinang	83,5	90,1	86,8
17	Yulidarnis	State Junior High School 7 Tanjungpinang	83,5	86,8	85,2
18	Sumarniati	State Junior High School 7 Tanjungpinang	76,9	90,1	83,5
19	Angga Adharullah	State Junior High School 9 Tanjungpinang	53,6	83,5	68,6
20	Sumitriani Dewi	State Junior High School 9 Tanjungpinang	70,3	86,8	78,6
21	Rasyidin	State Junior High School 9 Tanjungpinang	19,9	80,1	50,0
22	Rinaldi	State Junior High School 10 Tanjungpinang	57,1	73,6	65,4
23	Laila	State Junior High School 10 Tanjungpinang	70,3	83,5	76,9
24	Ramadina	State Junior High School 10 Tanjungpinang	83,5	93,4	88,5
25	James D Simanjuntak	State Junior High School 11 Tanjungpinang	83,4	86,8	85,1
26	Indra Jaya	State Junior High School 11 Tanjungpinang	83,5	80,2	81,9
27	Delvia Afriliani	State Junior High School 11 Tanjungpinang	83,5	90,1	86,8
28	Dian Purwanti	State Junior High School 12 Tanjungpinang	80,2	80,2	80,2

29	Vintaka Ratih	State Junior High School 12 Tanjungpinang	76,9	83,5	80,2
30	Indra Gunawan	State Junior High School 12 Tanjungpinang	80,2	80,1	80,1
31	Abdul Kadri	State Junior High School 16 Tanjungpinang	67,0	83,5	75,3
32	Yolanda Farmin	State Junior High School 16 Tanjungpinang	83,5	96,7	90,1
33	Adrinal Yaros	State Junior High School 16 Tanjungpinang	70,2	96,7	83,5
34	Siti Markhamah	ALMadinah T. Pinang IT Middle School	83,5	93,4	88,5
35	Mira Restuti	ALMadinah T. Pinang IT Middle School	60,4	93,4	76,9
36	Rudi	ALMadinah T. Pinang IT Middle School	60,4	90,1	75,3
37	Kershan Lendi	Maranatha T. Pinang Junior High School	43,5	76,9	60,2
38	Febermelinda Butar-butar	Maranatha T. Pinang Junior High School	73,6	90,1	81,9
39	Lidang Ribur Silitonga	Maranatha T. Pinang Junior High School	23,1	76,9	50,0
40	Safina Salma Ramadini	Maitreywira T. Pinang Junior High School	67,0	90,1	78,6
41	Fitri Mahendi Prameswari	Maitreywira T. Pinang Junior High School	49,5	93,4	71,5

42	Reynita Lumban Tobing	Maitreywira T. Pinang Junior High School	76,8	90,1	83,5
43	Purnama Sari Simare-mare	Kinarya Grasia TPI Junior High School	86,8	96,7	91,8
44	Dian Yustika Hiya	Kinarya Grasia TPI Junior High School	9,9	96,7	53,3
45	Nia Juniati Panjaitan	Kinarya Grasia TPI Junior High School	76,9	93,4	85,0
46	Efrida Sihombing	Anugerah T. Pinang Junior High School	67,0	83,5	75,3
47	Santi	Anugerah T. Pinang Junior High School	86,8	90,1	88,5
48	Hanna Paramiertha	Anugerah T. Pinang Junior High School	19,8	83,5	51,7
49	Mahar Anggoro	Pelita Nusantara TPI Junior High School	70,3	83,5	76,9
50	Dhimas Prihandhono	Pelita Nusantara TPI Junior High School	73,6	80,2	76,9
51	Maryamisa Lukmanamy	Pelita Nusantara TPI Junior High School	70,3	76,9	73,6
Average value			68,4	86,7	77,4
The highest score			86,8	96,7	91,8
Lowest value			9,9	70,3	40,1

Based on the provisions for assessing the In-Depth Learning (PM) training as stated in the Decree of the Director General of Teachers, Education Personnel and Teacher Education of the Ministry of Primary and Secondary Education No. 13/B/HK.03.01/2025, PM Training Participants are declared to have passed if they obtain an NA greater than 70 (>70.00) and a minimum attendance in the PM Training of 90%. Learning in the In-Depth Learning (PM) Training activity aims to measure the increase in participant competency after participating in all learning by comparing the pretest and posttest results. Based on the table above, it was found that the increase in pretest results compared to posttest results obtained a very significant increase, because there were 3 participants who did not experience an increase between the pretest and posttest results or equivalent to 5.88% and there were 48 participants who experienced an increase between the pretest and posttest results or equivalent to 94.11%

after participating in the In-Depth Learning (PM) training. In general, it also illustrates that the average pretest result (68.4) experienced an increase when compared to the average posttest result (86.7).

The calculation results show that Deep Learning (PM) training with synchronous and asynchronous training modes assisted by the In-On-In learning management system (LMS) model is a training that combines face-to-face learning (In-Service Learning) and direct practice in the workplace (On-the-Job Training) can improve teacher competence in implementing Deep Learning (PM) in Tanjungpinang City. Training with synchronous and asynchronous training modes assisted by the In-On-In learning management system (LMS) model can improve teacher competence in Tanjungpinang City because it equips teachers with new knowledge and skills, facilitates direct practice in the classroom with the support of colleagues and mentors, and encourages collaboration and continuous reflection, all of which contribute to improving the quality of teaching and learning outcomes. Lecture, question and answer, discussion, and demonstration methods can be applied in this training model (Zulyetti in Hasan, 2022). Thus,training with synchronous and asynchronous training modes assisted by the In-On-In learning management system (LMS) model can improve teacher competence in implementing deep learning (PM) in Tanjungpinang City.

The in-depth learning training that has been implemented has demonstrated a high level of effectiveness in improving participant competency, both in terms of conceptual understanding and technical skills in lesson planning and in classroom practice. This is reflected in several key indicators:

1. Achievement of Training Objectives

The training successfully met its primary objective, which was to improve the competency of teachers, principals, and school supervisors in implementing in-depth learning in accordance with their duties and functions.

2. Improved Participant Competence

Pre-test and post-test results showed an average score increase of 36%, indicating a significant improvement in understanding of the material. Furthermore, participants demonstrated increased confidence in developing in-depth learning plans (IDLs) and implementing them in their schools.

3. Participant Feedback

Based on the results of a survey administered to 51 training participants regarding the effectiveness of the activity implementation, the following data was obtained as feedback:

Table 2. Participant Feedback to Measure the Effectiveness of the Implementation of the In-Depth Learning (PM) Training in Tanjungpinang City

No	ıt Feedback to Measure the Effectiveness of Deep Learning (PM) Training Implementation	Good	Very Good
1	The event organizing committee was friendly, polite and responsive.	20 %	80%
2	The training organizing committee responded well to the participants.	20 %	80%

3	The training room is arranged cleanly and comfortably.	25 %	75%
4	The training speaker has clear voice intonation.	10 %	90%
5	The training material is presented in a structured and easy to understand manner.	25 %	75%
6	Training support facilities are sufficient to achieve training objectives.	30 %	70%
7	The training speaker explained the training material clearly.	20 %	80%
8	The training speaker was able to respond to participants' questions well.	15 %	85%
9	The training speaker was able to provide relevant answers according to the participants' questions.	25 %	75%
10	The training speaker presents the material with attractive PPT visuals.	30 %	70%
11	Training participants can understand the material presented by the speaker	20 %	80%
12	The training materials are useful for training participants as teachers.	15 %	85%
13	Training participants have a great opportunity to implement it effectively in their respective schools.	30 %	70%
14	In general, the training was effective.	30 %	70%
	Average percentage	22,5 %	77,5%
	Highest percentage	30 %	90%
	Lowest percentage	10 %	70%

Based on the table above, it can be concluded that in general the effectiveness of the implementation of the Deep Learning (PM) training was very effective, this can be seen from the table that participant feedback regarding the implementation of the activity was in the good and very good categories, where the average participant feedback in the good category was 22.5% and very good was 77.5%. The following is some documentation of activities during the implementation of the activity

Figure 2. Documentation of In-Service Activities .

This In activity was carried out at the BPMP building of the Riau Islands Province, the aim of this In activity was to provide PM Training participants with a conceptual understanding of growth mindsets, PM frameworks, learning principles and experiences, assessments, learning planning and collaborative inquiry and compiling RTL as a form of implementation of the results of this In activity.

Figure 3. Documentation of On-line Activities

This On activity is carried out at the teacher's school who is the Model Teacher, the purpose of this On activity is that participants can implement the RTL that has been designed during the In meeting. In this activity, participants teach in class and are observed by other teachers as a form of good practice and provide feedback to each other; and reflection, to improve learning strategies, this activity is accompanied by PM Training instructors 3 (three) times.

Conclusion and Recommendations Conclusion

Based on the discussion above, the results of this community service can be concluded that training using synchronous and asynchronous training modes assisted by the learning management system (LMS) In-On-In or In-service Learning 1 (In-1), On the Job Learning (On) and In-service Learning 2 (In-2) models can improve teacher competency in

implementing in- depth learning (PM) in Tanjungpinang City, especially in preparing in-depth learning plans and practicing in-depth learning approaches in classroom learning. Where based on the data obtained that the increase in pretest results with posttest results experienced a very significant increase before and after participating in training activities, the average pretest result was 68.4 experiencing an average increase in the posttest result of 86.7. From the pretest and posttest results, there were also 48 participants who experienced an increase between the pretest and posttest results or equivalent to 94.11% after participating in the In-depth Learning (PM) training and were able to practice the in-depth learning approach in their respective classes.

Recommendations

For this reason, local governments need to implement training with synchronous and asynchronous training modes assisted by the learning management system (LMS) In-On-In or In- service Learning 1 (In-1), On the Job Learning (On) and In-service Learning 2 (In-2) models to improve teacher competency in implementing in-depth learning approaches to schools that have not yet participated in in-depth learning training. Providing equitable training to teachers in the outermost, disadvantaged, and remote areas in Indonesia to improve teacher competency in implementing in-depth learning approaches (PM), both in designing learning plans and in classroom learning practices.

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