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Implementation of Deep Learning in School Curriculum: Perspectives of Teachers in Nagekeo Regency

Yohanes Freadyanus Kasi[1*], Delviana Vivi Bai[2], Novia Novia[3], Saprolla Rollie C. Deporos[4], Ahmad Dindang Mababaya[5]

[1,2] Program Studi Ilmu Perikanan, Institut Nasional Flores, East Nusa Tenggara, Indonesia
[3] Chemistry Education Study Program, Faculty of Teacher Training and Education, Sebelas Maret University, Surakarta, Indonesia
[4,5] Wisdom Islamic School, Davao City Inc. The Philippines

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*Corresponding Author Email:
yohaneskasi@gmail.com

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Abstract: Education is the main pillar in forming individuals who are able to face global challenges in the modern era. This study aims to depict teachers' perceptions of deep learning-based instruction, including a deeper understanding of its definition. The subjects in this study consisted of 30 teachers in Nagekeo Regency from elementary to secondary school level. A set of questionnaires consisting of open and closed questions about teachers' perceptions and understanding of deep learning-based instruction and 21st century skills preparation were developed and implemented. Responses from science teachers were analyzed through interpretive methods to gain their understanding and perspectives. The results of the study show that 1) most teachers (83%) know about 21st century skills, 2) deep learning-based instruction is quite well understood (62,4%) by teachers in Nagekeo Regency, 3) the government has paid attention to education but not optimally and 4) 100% of teachers are involved in the subject teacher forum (MGMP). It is important for us to focus on teachers as they play a crucial role in the success of the new reforms. The implication is that there is a great need to raise awareness at the government and teacher levels to embrace deep learning-based instruction.

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INTRODUCTION

In recent years, including in Nagekeo Regency, the learning approach has undergone significant transformation along with the development of technology and the need for students to understand concepts more deeply, actively, creatively, meaningfully and relevantly to everyday life (Akmal et al., 2025; Darmayanti et al., 2023; Mystakidis et al., 2021). However, in reality, classroom instruction is still not directed at improving students' creative, critical, innovative thinking skills and problem-solving abilities (Astria & Kusuma, 2023; Ruhyanto et al., 2021; Cintia et al., 2018; Sumartini, 2016; Yazar Soyadı, 2015; Hu et al., 2016). In fact, one of the indicators of good learning outcomes is that students can understand the content of the materials taught by the teacher (Firmansyah et al., 2024; Barab et al., 2007). Teachers in Nagekeo explained that the school has implemented the 2013 curriculum, but they do not implement the contents of the curriculum. Although this original method and approach have proven successful elsewhere, it seems that teachers have not linked learning to students' daily lives/problems to improve their problem-solving skills (Kasi, Y. F., Samsudin, A., Widodo, 2020).

The concept of deep learning-based instruction aims to create more meaningful, critical learning and to produce new solutions with creative insights into problems in the environment (Diputera et al., 2024). Deep Learning (Marton & Saljo, 1976), not only focuses on mastery of material, but also on deep understanding and the relevance of the concepts learned to everyday life (Arif et al., 2025). Deep Learning occurs when students are actively involved in the learning process and are given the opportunity to build meaning (Hay et al., 2008). In addition, deep learning is related to various types of creative, critical,

reflective thinking, caring attitudes (Valtanen et al., 2008), and problem-solving abilities (Dolmans et al., 2016).

The deep learning approach is not a new curriculum, but rather an approach to learning that can potentially increase the effectiveness of learning, focusing on deep understanding, critical thinking, internalizing meaningful knowledge, and enjoyable learning. This deep learning approach does not refer to the advancement of artificial intelligence technology, but rather to a strategy for improving the quality of education that emphasizes students to be active and to understand meaning deeply. This approach empowers students to think more critically and more deeply, collaborate actively, and solve problems meaningfully (Khotimah & Abdan, 2025). The deep learning approach seeks to transform the traditional learning paradigm that emphasizes memorization and repetition of information, into more constructive and reflective learning (Mutmainnah et al., 2019).

Research by Biggs *et al.* (2011), shows that the deep learning approach has been implemented in many countries by showing relevant developments and results in improving the quality of understanding and level of student engagement. However, the identification of understanding of the deep learning approach by teachers in schools is still rare. In general, previous studies only describe the results of using the approach, such as focusing on understanding concepts, critical thinking skills, creativity, character building, and application. Meanwhile, the development of an approach that is appropriate for their students in class needs to be published. Specifically, more journal analysis can encourage other researchers to expand knowledge about deep learning for students. The results of the researcher's preliminary study related to deep learning for the last 2 years have been conducted on participants of elementary school students, high school students, college students, and teachers. Deep learning will be a trend in Indonesia, but the focus is not yet related to teachers' understanding of deep learning. Therefore, the values for deep learning development will be studied in this paper.

Although Indonesia is a large country with abundant natural and human resources, the quality of education in Indonesia is considered very lacking compared to other countries in the world (Suncaka, 2023). The output of educational outcomes has not been in accordance with the achievements of national education goals in Indonesia (Patandung & Panggua, 2022). One of the factors that determines the success of an education system is the teachers (Trehan & Paul, 2014; Ferreira et al., 2007). Teachers are intellectual actors who are recognized as having a knowledge base and skills developed during their teaching activities (Fernandez, 2014). Teachers are expected to be able to work according to new curriculum standards and update their knowledge through activities such as workshops, lesson studies, peer teaching, and classroom demonstrations (Kasi et al., 2022). This research needs to be conducted, as in this era of disruption marked by rapid change, it can demand a paradigm shift in education. The deep learning mindset is crucial for teachers to be able to face the complexity of the times (Hendrianty et al., 2016). In addition, this concept can increase students' environmental awareness and improve their critical thinking skills. Thus, the purpose of this study, i.e., to identify teachers' insights into deep learning-based instruction, is very important because it can influence the development of education in Indonesia.

METHOD

The researchers used quantitative instruments such as surveys to examine teachers' perceptions of deep learning-based instruction. Surveys were used to collect data at specific points in time to describe the nature of existing conditions (Cohen et al., 2007). The population in this study was elementary and high school teachers in Nagekeo Regency. The sampling technique was purposive sampling, which was used to choose a representative sample according to the needs. The teachers selected were according to the objectives, namely those who are actively teaching in schools from elementary to secondary levels. Participants in this study consisted of 30 teachers from various levels and schools in Nagekeo Regency. The research respondents are described in Table 1.

Data were collected using a questionnaire consisting of open and closed questions about teachers' perceptions and understanding of deep learning-based instruction and 21st-century skills preparation. The questions are as shown below:

1. Do you know what competencies and skills are needed in the 21st-century workforce? (Q1)
2. Do you know about deep learning or deep learning-based instructional models? (Q2)

3. Do you know about problem-solving skills? (Q3)
4. As a teacher, do you know and apply deep learning-based instructional models to facilitate students in facing the 21st century? If the answer is yes, how do you apply it? (Q4)
5. In your opinion, can the implementation of current learning models such as deep learning-based instructional model help students improve their ability to solve problems around them? (Q5)
6. In your opinion, has the government made their best efforts in preparing quality teachers? (Q6)
7. School facilities and infrastructure are one of the important factors in the learning process. Are the facilities and infrastructure at the school where you teach adequate? (Q7)
8. Are you involved in the subject teachers' forum (*Musyawarah Guru Mata Pelajaran*, henceforth *MGMP*) of Middle Schools? (Q8)
9. Do you feel a significant impact from the subject teachers' forum (*MGMP*) on how you carry out the learning process? (Q9)

Table 1. Research Respondents

Teacher	Sex		Teaching Experience			Subject Taught
Teaching Level	Male	Female	0-10 yr	11-20 yr	21-30 yr	
Elementary School	1	2	2	2	1	Homeroom Teacher, Mathematics, English
Junior High School	2	19	7	10	2	Science Education, Guidance and Counseling, Religious Education, Indonesian, English, Mathematics, Crafts, Civics Education
Senior High School	2	3	1	3	2	Economics, Crafts, English
	6	24	10	15	5	

Researchers distributed research questionnaires using Google Form links, which were distributed to teachers directly, either personally or using social media groups (WhatsApp). The teachers' answers were analyzed using the interpretive method (Erickson, 1986), where the meaning and perspective of the respondents were identified. Qualitative document analysis is a qualitative content analysis that examines the relationship between documentation and research results. The data in this study were recorded, selected, and then classified according to existing categories, using a descriptive analytical approach. With the qualitative document analysis framework, coding of research papers can be done. Each research paper is given a descriptive point of view and becomes a thematic structure for deep learning-based instruction. After the authors collect materials related to the problems to be discussed in this study, the authors then interpret them to draw conclusions.

RESULT AND DISCUSSION

Nagekeo Regency is one of the areas in East Nusa Tenggara province that still maintains high values of mutual cooperation and religious tolerance (Ani et al., 2024). Geographically, the boundaries of the Nagekeo region are in the north bordering the Flores Sea, in the south bordering the Sawu Sea, in the east bordering Ende Regency and in the west bordering Ngada Regency (Nagekeo, 2021). In the context of education, Nagekeo has 3612 teachers ranging from kindergarten to high school/vocational school levels spread across 7 sub-districts. Teacher data in the Nagekeo district is shown in the table below:

Table 2. Data of Teachers in Nagekeo Regency – Dapodikdasmen

No	Area	Kindergarten	Elementary School	Junior High School	Senior High School	Vocational School	Total
1	Aesesa District	71	410	251	202	126	1060
2	Boawae District	80	359	238	130	45	852
3	Nangaroro District	41	270	130	13	58	512
4	Mauponggo District	48	262	118	36	0	464
5	Keo Tengah District	34	192	78	53	0	357
6	Aesesa Selatan District	13	116	50	0	28	207
7	Wolowae District	18	81	29	32	0	160
	Total	305	1690	894	466	257	3612

Source: https://dapo.dikdasmen.go.id/guru/2/241700

The results of the survey given to teachers in Nagekeo Regency in the context of their perceptions of deep learning-based instruction and 21st century skills are explained as follows:

Knowledge of 21st-century skills

The results show that most teachers in Nagekeo Regency (83%) already know about 21st-century skills. Respondent R8 revealed that,

> *…in the 21st-century workplace, some of the competencies and skills that are highly needed are critical thinking, creativity, communication, collaboration, digital literacy, and adaptability. These skills help individuals to succeed in a dynamic and competitive work environment.*

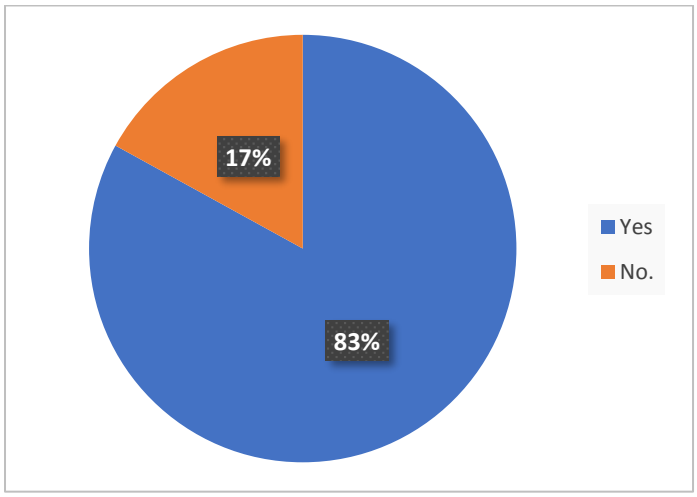

Figure 1. Knowledge of 21st-century skills

This means that teachers already know and are able to apply 21st-century learning in their classrooms. The results are in accordance with those expressed by (Sahil *et al.*, 2020) that most teachers (85.7%) have implemented instruction that leads to improving 21st Century skills as a result of their understanding of 21st-Century skills. However, 17% of teachers still answered incorrectly and do not even know about 21st-century skills. Previous research explains that 33.33% of teachers do not know and understand 21st Century skills (Habib et al., 2020). The results explain that teachers in Indonesia, especially in Nagekeo Regency, already know about the skills that students need to have towards Indonesia Emas 2045, namely 21st Century skills. This means that every lesson in class by teachers will direct their students to improve these skills, so that they can compete in the current era of disruption.

Deep learning and problem-solving skills

The results show that most teachers in Nagekeo Regency (83%) already know about 21st-century skills. Respondent R8 revealed that,

> *…in the 21st-century workplace, some of the competencies and skills that are highly needed are critical thinking, creativity, communication, collaboration, digital literacy, and adaptability. These skills help individuals to succeed in a dynamic and competitive work environment.*

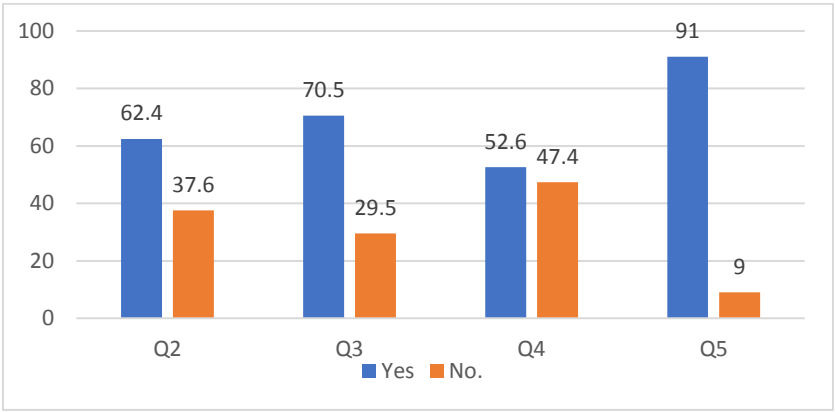

Figure 2. Teachers' Understanding of Deep Learning and Students' Problem-Solving Skills

These results in Figure 2 provide great opportunities for creating meaningful learning for students in the classroom. Teachers will begin to direct problem-based learning to improve critical thinking and problem-solving skills. Students in their groups will provide new ideas or innovations in solving problems around them. Furthermore, in the context of teachers' understanding of students' problem-solving abilities, most teachers (70.5%) already know about problem-solving abilities, *i.e.,* the ability to identify problems, analyze their causes, develop solutions, and choose the most effective solution to overcome the problem. R24 mentions:

> *...the ability to define, analyze, and solve problems faced through a systematic thinking process. This ability involves steps such as problem identification, information gathering, data analysis, alternative solution development, and evaluation and implementation of the most effective solution.*

As many as 91% of teachers agree that deep learning-based instruction can help students improve their ability to solve problems around them. However, only a few (52%) teachers in Nagekeo Regency apply a deep learning-based instructional model to facilitate students in facing the 21st century. In fact, according to Hendrianty, *et al.* (2016), teachers have a strategic role in building a deep learning mindset in students. Teachers need to design instruction that triggers students' curiosity and link learning materials with students' daily experiences so that they can better understand real learning (Mariyah, Salwa & Firdaus, 2024). In terms of the implementation of Deep Learning-based learning by teachers, there needs to be government attention to be able to provide stimulus through teacher competency improvement programs so that they are expected to be able to innovate in creating meaningful learning in the classroom.

Government attention to improving teacher competence

Respondent R18 mentions that:

> *The Indonesian government has made various efforts to prepare quality teachers, but it cannot necessarily be said to be "the best" because there are still challenges and scope that need to be improved. These efforts include improving teacher qualifications, improving welfare, training, and programs such as PPG (Pendidikan Profesi Guru - Teacher Professional Education) and Guru Penggerak (Teacher leaders driving educational transformation).*

The teachers said that the government had actually made the best efforts to prepare quality teachers, such as paying attention to learning facilities and infrastructure, although not yet optimal, and implementing programs that included improving teacher professionalism so that they could collaborate in developing lesson plans and practices, certification, and improving welfare. However, there are still challenges in meeting the need for quality teachers, especially in remote and less accessible areas. Research shows that most teachers think the program in *MGMP* has been implemented according to standards, but needs to be improved in selecting the proper method (Kasi *et al.,* 2020). There needs to be a program to improve teacher professionalism by utilizing a collaborative and technological approach that also pays attention to the internet network in these remote areas. Research reveals that there needs to be a partnership and technology approach in a program to improve teacher professionalism so that teachers can collaborate routinely by utilizing technology (Kasi *et al*., 2022). The government should focus more on improving teachers' professionalism in the regions, so that they can improve skills that lead to student learning outcomes. Government programs can be carried out well and not just as an opening event, but more focused on the substance of the program, for example, providing competent speakers, facilities, and infrastructure, and utilizing technology to ensure its sustainability. In the context of utilizing technology, it will provide opportunities for teachers to continue to meet every week even though they are far apart.

Involvement in teacher professionalism improvement programs

Teachers in Nagekeo regency mention that all of them (100%) are involved in the teacher professionalism improvement program in the subject teachers' forum (*MGMP*), which facilitates the gathering of teachers of the same subject to develop their professionalism in designing and implementing lessons in the classroom. The teachers explain that they benefit from being involved in the forum:

> *The positive impact of the MGMP that I have participated in so far has been quite helpful in my efforts to improve the quality/competence in implementing my instructions, because I collaborate with my colleagues in planning, implementing and evaluating students learning, which ultimately has a positive impact on their learning outcomes.*

Being involved in the subject teacher forum (*MGMP*) activities significantly affects how teachers carry out the instructional process. In addition, the *MGMP* forum helps teachers to improve their knowledge, skills, and professionalism in teaching, so that the quality of classroom instruction increases. Teachers will continue to try to adjust the method to the learning objectives, students' learning styles, and students' characters with different backgrounds; create a conducive learning environment; motivate students to be active and actively participate and evaluate each other; be reflective and take steps to improve. Teachers in Nagekeo explained that these knowledge, skills, and attitudes were acquired by science teachers while involved in the program in *MGMP* (Kasi *et al.,* 2020). Although this professionalism improvement program has only been driven by the Principals' Working Conference (MKKS), which is not fully funded by the local government. In addition, there is no existing focus on material related to *Deep Learning*.

Deep learning-based instruction involves students playing an active role and encouraging student creativity in the learning process based on their learning styles, as well as creating a safe and enjoyable learning atmosphere. Deep learning focuses on creating more meaningful, critical learning and producing new solutions with creative insights into problems in their environment (Mystakidis *et al.,* 2021). Furthermore, it should encourage active student participation, collaboration, and critical thinking, and consider diverse learning contexts. Teachers can also utilize technologies, such as learning videos, educational software, or social media to enhance student interaction and understanding. By implementing deep learning-based instruction, teachers can create a dynamic, engaging, and effective learning environment, so that students can learn more enjoyably and construct their own meaning (Hay et al., 2008). Students are directed to solve problems around them, such as blood disease in banana plants in Nagekeo Regency and the spread of the African Swine Fever (ASF) virus, a highly contagious viral disease in pigs. Teachers can present these contextual problems and, together with students, develop solutions to handle them.

CONCLUSION

This study identifies teachers' perceptions of deep learning-based learning and skills for facing the 21st century. Currently, deep learning is getting wide attention in education reform around the world. We need to pay attention to teachers because they play a vital role in the success of new reforms. The conclusion of the study explains that most teachers know about 21st-century skills (83%). Furthermore, Deep Learning is quite well understood by teachers (62.4%) and all teachers are involved in their professional development forums. The suggestion is that there is a substantial need to increase the government's and teachers' awareness to embrace deep learning-based instruction to improve students' 21st-century skills, including problem solving. In addition, the agenda requires a forum group discussion between the government and teachers to improve teachers' perceptions of deep learning. This study recommends significant support for access to support teachers in understanding deep learning-based instruction. This implies that not only is awareness needed, but also discussions about how deep learning will be implemented in the classroom. The curriculum is expected to consider what deep learning looks like, who should be involved (students and teachers), and how it should be implemented. Future research can focus on developing teaching models and curriculum materials using deep learning.

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