Innovative Practices: Integration Of Deep Learning and Values Education, Realizing 8 Dimensions of Graduate Profile

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Abstract: *The Independent Curriculum encourages learning transformation that focuses on character development and 21st-century competencies through the integration of deep learning, value education, and eight dimensions of the Graduate Profile. This article aims to describe the results of community service in the form of a workshop for 60 high school Biology teachers in Cirebon Regency, which aims to improve teachers' understanding and skills in designing integrative learning. The method used is participatory-based training, equipped with pre-post assessment, simulation of lesson plan preparation, and assessment of Teaching Program Plan (RPP) products with standardized rubrics. The results of the analysis showed a significant increase in understanding the concept and application of character values in the RPP. Pre- and post-workshop assessments showed significant improvements in teacher competencies: the mean pre-assessment score on deep learning understanding increased from 32% to 78% ($\Delta=46\%$, $p<0.01$), while awareness of values integration increased from 45% to 85% ($\Delta=40\%$, $p<0.01$). In addition, 88% of participants reported increased confidence in designing values-based lesson plans. These quantitative findings, supported by qualitative reflections, demonstrate the effectiveness of the workshop in changing teaching practices. This suggests that the integrative workshop can build teachers' pedagogical competencies and realize meaningful, contextual, and values-oriented Biology learning.*

Introduction

Global education is currently facing a relevance crisis, where classroom learning often still focuses on transferring information, rather than building deep and meaningful understanding. Many education systems, including in Indonesia, still emphasize memorization-based academic achievement and narrow standardized tests, rather than

on developing higher-order thinking skills. According to Harlen (2013), memorization-based learning not only limits students' conceptual understanding, but also hinders their capacity to adapt to real-world challenges. This condition causes students to lack intrinsic motivation to learn and fail to develop critical, creative, and reflective thinking skills, which are actually the core of deep learning [1].

Global education is currently experiencing a relevance crisis: international assessments such as PISA 2022 show a 5-point decline in science literacy over the past decade, and national surveys report that only 30% of students meet critical thinking benchmarks. This crisis underscores the need for pedagogical innovations that foster both cognitive depth and moral integrity. Deep learning approaches—characterized by analysis of complex cases and reflective inquiry—offer powerful tools for nurturing critical thinking, yet their social and ethical dimensions are often underemphasized in science education [2].

Most teachers in the field, including high school Biology teachers, still apply conventional learning that focuses on delivering content without building a context of values, character, or 21st-century skills. In fact, according to Chai et al. (2013), the success of learning in the 21st century is not only determined by what is taught, but how students are given space to build meaning, collaborate, and reflect. Biology learning that only conveys facts without linking them to social and ethical realities, such as environmental, health, or bioethics issues, makes students lose the connection between science and everyday life [3]. The lack of approaches such as project-based learning, ethical discussions,

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[1] Wynne. Harlen, *Assessment & Inquiry-Based Science Education: Issues in Policy and Practice* (Global Network of Science Academies, 2013), accessed April 10, 2025, https://www.interacademies.org/sites/default/files/publication/ibse_assessment_guide_iap_sep_0.pdf; Z Ramdani, M D Kembara, and ..., "Teachers' Perception and Readiness Towards Adaptive Learning in the COVID-19 Pandemic: Thematical Content Analysis Study," *AL-ISHLAH ...* (2021), http://journal.staihubbulwathan.id/index.php/alishlah/article/view/915; Maulia Depriya Kembara et al., *Research-Based Lectures to Improve Students' 4C (Communication, Collaboration, Critical Thinking, and Creativity) Skills*, 2019; Cindy E. Hmelo-Silver, "Problem-Based Learning: What and How Do Students Learn?," *Educational Psychology Review* 16, no. 3 (September 2004): 235–266; C.-S Sing Chai, J H.-L Koh, and C.-C Tsai, *A Review of Technological Pedagogical Content Knowledge*, *Educational Technology & Society*, vol. 16, 2013.

[2] Mohammad Chowdhury, "Emphasizing Morals, Values, Ethics, And Character Education In Science Education And Science Teaching," *The Malaysian Online Journal of Educational Science* 4, no. 2 (2016), accessed May 3, 2025, https://files.eric.ed.gov/fulltext/EJ1095995.pdf.

[3] C.-S Sing Chai, J H.-L Koh, and C.-C Tsai, *A Review of Technological Pedagogical Content Knowledge*, *Educational Technology & Society*, vol. 16, 2013; M D Kembara, *ANALISIS IMPLEMENTASI PENDIDIKAN NILAI MELALUI MATA PELAJARAN SAINS DI SLTP ISLAM TERPADU* (repository.upi.edu, 2005), http://repository.upi.edu/id/eprint/76731; M D Kembara, *ANALISIS KEMAMPUAN LITERASI SAINS DAN SIKAP CALON GURU NON IPA TERHADAP LINGKUNGAN PADA KERANGKA SAINS SEBAGAI PENDIDIKAN ...* (repository.upi.edu, 2015), http://repository.upi.edu/21058; Ramdani, Kembara, and ..., "Teachers' Perception and Readiness Towards Adaptive Learning in the COVID-19 Pandemic: Thematical Content Analysis Study"; Kembara et al., *Research-Based Lectures to Improve Students' 4C (Communication, Collaboration, Critical Thinking, and Creativity) Skills*; M D Kembara et al., "Research Based Learning to Improve Students 6c Skills during the Pandemic," *4th Social and ...* (2022), https://www.atlantis-press.com/proceedings/sores-21/125973461; Maulia Depriya Kembara et al., *Research Based Learning to*

or problem solving also shows that students' affective and social aspects have not been optimally accommodated.

On the other hand, an important dimension that is often overlooked in learning is value education. In fact, education is not just the transmission of knowledge, but also the process of forming the personality and moral integrity of students. Research by Berkowitz & Bier shows that when value education is integrated into regular learning, there is a significant increase in students' prosocial attitudes, social responsibility, and academic achievement [4]. However, in reality, most teachers have not been equipped with sufficient understanding and skills to systematically incorporate values (such as empathy, justice, responsibility, and honesty) into the learning process, including in science learning.

Values education, which embeds moral and civic values (e.g., empathy, honesty) into learning activities, provides a complementary pathway for holistic student development. By integrating deep learning with values education, teachers can facilitate inquiry-based projects that simultaneously develop students' analytical skills and internalize character strengths. However, the intersection of these two domains remains underexplored, particularly in contexts where resource constraints and traditional teaching models prevail[5].

In addition, the implementation of the Independent Curriculum which carries the Pancasila Student Profile as a graduate orientation has not been fully understood and translated by teachers in learning practices. The eight dimensions of the profile—spiritual, ethical, intellectual, emotional, social, creative, global, and independence—require an integrated and contextual pedagogical approach. However, based on a field study by Khasanah, the majority of teachers still understand this profile normatively and have not linked it to authentic learning design or assessment [6]. This shows a gap between curriculum policy and the reality of implementation in the classroom.

In Cirebon, Biology teachers face specific challenges: only 20% have received

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Improve Students 6C Skills During the Pandemic, 2022; Maulia Depriya Kembara et al., *Scientific Literacy Profile Of Student Teachers On Science For All Context*, 2020, www.solidstatetechnology.us.

[4] Marvin W. Berkowitz and Melinda C. Bier, "Research Based Character Education," *Annals of the American Academy of Political and Social Science*, January 2004; M W Berkowitz, M C Bier, and ..., "Toward a Science of Character Education," *Journal of Character ...* (2017), https://books.google.com/books?hl=en&lr=&id=qCJIDwAAQBAJ&oi=fnd&pg=PA33&dq=source:journal+ character+assessment&ots=_CcyXsxlsb&sig=Q5NIkOMVrh2MdQj9LJxDFI4549o.

[5] Kokom Komalasari, Didin Saripudin, and Iim Siti Masyitoh, *Journal of Education and Practice Www.Iiste.Org ISSN*, *Online)*, vol. 5, 2014, www.iiste.org.

[6] Uswatun Khasanah et al., "The Teacher's Role as an Applicator of 'Profil Pelajar Pancasila' in 'Merdeka Belajar' Curricullum," *International Journal of Research and Community Empowerment* 01, no. 01 (2023): 2985–6175, https://doi.org/10.58706/ijorce; P K S Ramirez et al., "Subcategory Assessment Method for Social Life Cycle Assessment. Part 1: Methodological Framework," *... of Life Cycle Assessment* (2014), https://link.springer.com/article/10.1007/s11367-014-0761-y; N Iofrida et al., "Can Social Research Paradigms Justify the Diversity of Approaches to Social Life Cycle Assessment?," *... of Life Cycle Assessment* (2018), https://link.springer.com/article/10.1007/s11367-016-1206-6.

formal training in problem-based learning, and 65% report limited access to laboratory facilities. To address these issues, we designed a community service workshop aimed at empowering teachers to become facilitators of meaning-making and value-based science education[7].

Considering these challenges, systematic and contextual interventions are needed in the form of training or workshops that not only contain conceptual materials, but also direct practice in designing integrative learning. Workshop activities based on deep learning, values, and 21st century skills can be a transformative means to increase teacher capacity in presenting relevant and meaningful learning. A study by Mezirow states that reflective and collaborative training can change teachers' perspectives on teaching, from mere instructors to facilitators of meaning [8].

Community service activities carried out in the form of workshops for high school biology teachers in Cirebon Regency are concrete steps to answer these challenges. This workshop not only aims to improve teachers' understanding of the concept of in-depth learning and value education, but also equips them with practical skills in designing Learning Implementation Plans (RPP) that support the realization of the eight dimensions of the Pancasila Student Profile. It is hoped that after the training, teachers will not only be able to apply innovative and integrative learning approaches, but also become agents of change in strengthening the character and competence of future generations.

Method

This community service activity was carried out in the form of an interactive workshop that combines face-to-face and online approaches (blended learning), which was strategically designed to improve the pedagogical capacity of Biology teachers in integrating deep learning, value education, and 21st century skills into classroom learning practices. This activity took place with a total effective duration of 32 hours consisting of pre-assessment, training, mentoring, and independent assignments. A total of 60 high school Biology teachers who are members of the Cirebon Regency Subject Teachers' Conference (MGMP) actively participated in this activity.

The implementation of the workshop was designed based on the experiential learning principle developed by Kolb, where teachers do not only receive material passively, but also through a cycle of direct experience, reflection, conceptualization, and

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[7] Adi Pasah Kahar and Kiki Damayanti, "Pemanfaatan Potensi Lokal Sebagai Pondasi Konstruktivisme Guru Biologi Kabupaten Kubu Raya Mewujudkan Learning Biology Problem Orientation," *Al-Khidmah* 1, no. 1 (August 12, 2018): 13.

[8] Jack Mezirow, *Transformative Dimensions of Adult Learning* (San Francisco: Jossey-Bass, 1991); Ramdani, Kembara, and ..., "Teachers' Perception and Readiness Towards Adaptive Learning in the COVID-19 Pandemic: Thematical Content Analysis Study."

application [9]. In addition, the approach used is in line with Apriliyanti's findings, which state that experience-based and project-based training has been shown to improve teacher competence in implementing character-based and contextual learning [10].

Technically, the activity begins with a pre-assessment to map the level of participants' initial understanding of the core concepts that are the focus of the training. This pre-assessment is in the form of an online questionnaire designed to measure the following dimensions: (1) understanding of in-depth learning, (2) awareness of the importance of value education, and (3) integration of 21st century skills such as collaboration, communication, creativity, and critical thinking (4C). The questionnaire was developed based on the 21st century teacher literacy competency indicators from the UNESCO framework[11] and reviewed by education experts as a form of content validity[12].

Next, participants attended the core workshop session consisting of a presentation of conceptual material, case discussions, and direct practice in designing an integrated Learning Implementation Plan (RPP). The material was delivered using a constructivist pedagogy approach, which emphasizes active, collaborative, and reflection-based participation—as recommended by Rahayu (2024) in research on TPACK and value-based teacher training . The facilitator guided participants in compiling a RPP that combined biology content with value reinforcement (e.g. moral, religious, or environmental values) and 4C skills, referring to the Merdeka Curriculum Teaching Module format[13].

After the training session, participants were given 14 days to prepare and upload

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[9] David A. Kolb, *Experiential Learning: Experience As The Source Of Learning And Development* (New Jersey: Prentice-Hall, 1984); Khasanah et al., "The Teacher's Role as an Applicator of 'Profil Pelajar Pancasila' in 'Merdeka Belajar' Curricullum."

[10] Dewi Listia Apriliyanti, "Enhancing Teachers' Competencies through Professional Development Program: Challenges and Benefactions," *Acuity: Journal of English Language Pedagogy, Literature and Culture* 5, no. 1 (January 9, 2020): 28–38.

[11] Hasan Bedir, "Pre-Service ELT Teachers' Beliefs and Perceptions on 21st Century Learning and Innovation Skills (4Cs)," *Dil ve Dilbilimi Çalışmaları Dergisi* 15, no. 1 (April 1, 2019): 231–246; Philip E Bernhardt, *The Qualitative Report 21st Century Learning: Professional Development in Practice*, *P. E*, vol. 20, 2015, http://nsuworks.nova.edu/tqr/vol20/iss1/1; Samuel Kai Wah Chu et al., "Teachers' Professional Development," in *21st Century Skills Development Through Inquiry-Based Learning* (Singapore: Springer Singapore, 2017), 109–129; Daniela Cretu, "Fostering 21st Century Skills For Future Teachers," 2017, 672–681.

[12] Branden Thornhill-Miller et al., "Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education," *Journal of Intelligence* (MDPI, March 1, 2023).

[13] Ayu Rahayu et al., "Pelatihan Penyusunan RPP Dan Modul Proyek P5 Digital Terintegrasi Kurikulum Merdeka: Upaya Mendukung Sekolah Adiwiyata Mandiri," *Prima Abdika: Jurnal Pengabdian Masyarakat* 4, no. 4 (November 9, 2024): 763–773, https://e-journal.uniflor.ac.id/index.php/abdika/article/view/4830; I. Novidsa, W. Purwianingsih, and R. Riandi, "Technological Pedagogical Content Knowledge (TPACK) Prospective Biology Teacher in Integrating Education for Sustainable Development (ESD) in Their Learning Planning," in *Journal of Physics: Conference Series*, vol. 1806 (IOP Publishing Ltd, 2021).

the lesson plan as an independent assignment. The participants' lesson plan products were then evaluated by the facilitator team using a qualitative assessment rubric that had been developed and tested previously as shown in Table 1. This rubric includes the following indicators: (1) clarity of the lesson plan structure, (2) integration of values, (3) relevance to 21st century skills, and (4) orientation to the 8 dimensions of the Pancasila Student Profile. This rubric adapts the criteria from the research[14] on the development of value-based contextual teaching modules.

Table 1. RPP Assessment Rubric

Rated aspect	Evaluation Criteria	Score (1–5)
RPP Structure	Completeness of RPP components: identity, learning objectives, activities, assessments, learning resources	1 = very lacking – 5 = very complete
Learning Objectives (ATP & CP)	Alignment of objectives with learning outcomes and the principle of differentiation	1 = not relevant – 5 = very relevant
Integration of Character Values	Involvement of moral, environmental, religious and ethical values in learning activities	1 = none – 5 = very strong
Deep Learning Approach	Learning strategies reflect critical, exploratory, reflective, contextual thinking processes.	1 = teacher-centered – 5 = student-centered problem/project based
21st Century Skills (4C)	Activities include collaboration, communication, creativity, and critical thinking explicitly.	1 = not reflected – 5 = all covered
Pancasila Student Profile Orientation	Activities support the achievement of dimensions such as mutual cooperation, critical reasoning, creativity, independence, etc.	1 = not relevant – 5 = very relevant
Learning Innovation	Use of creative approaches and media: technology, projects, case studies, local mapping	1 = very conventional – 5 = very innovative
Student Evaluation and Reflection	Authentic assessment activities and student reflection space (self/social/values)	1 = none – 5 = very explicit and in-depth

[14] Eni Rindarti, Peningkatan Kompetensi Guru Dalam Mengembangkan, and Rpp Kurikulum, "IMPROVEMENT TEACHER COMPETENCE IN DEVELOPING RPP ON THE 2013 CURRIKULUM 2017 REVISION THROUGH ACCOMPANIMENT OF SUSTAINED IN MA TARGET CENTRAL JAKARTA TOWN LESSON 2017/2018," *Jurnal Penelitian Kebijakan Pendidikan* 11, no. 2 (2018).

In addition, the team also conducted participant observation during the training to record participant behavior, collaborative interactions, and initiatives during group discussions and presentations. This observation data was used as additional qualitative data to strengthen the findings of the quantitative instrument. This instrument triangulation approach—questionnaire, rubric, and observation—was chosen to obtain a comprehensive picture of the workshop's effectiveness in building teacher capacity[15]. With this data triangulation, implementers can evaluate training achievements more comprehensively and in-depth. The overall flow of activities can be seen in Figure 1.
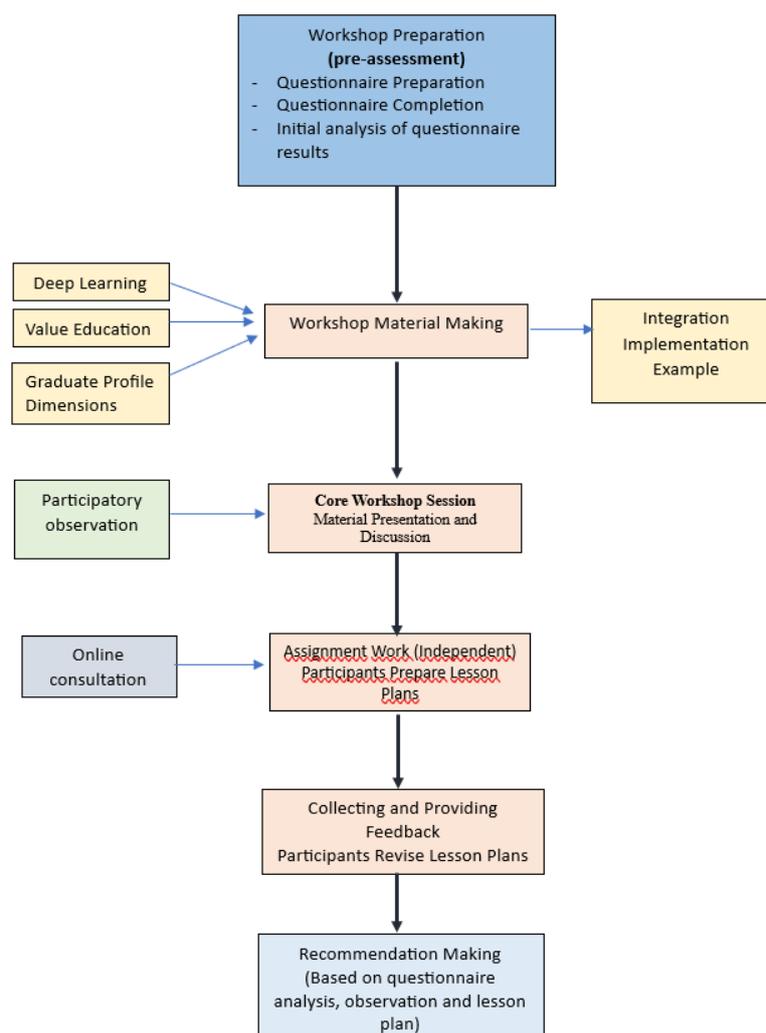

Figure 1. Training activity design

15 John W. Creswell, "Research Design Qualitative, Quantitative, and Mixed Methods Approaches Fourth Edition" (2014), accessed March 13, 2025, https://books.google.co.id/books?id=4uB76IC_pOQC&lpg=PR4&hl=id&pg=PR3#v=onepage&q&f=false.

Result

Based on the pre-assessment data, the participants consisted of 60 participants, with a work period of less than 5 years as much as 71.67%, 5-10 years 28.33% and more than 10 years 43.33% (Figure 2). Most of the workshop participants (71.67%) were teachers with a work period of less than five years. This shows that the majority of participants are a new generation of teachers who are still in the exploration and strengthening of professional competence. Another 28.33% have a work period of 5-10 years, and 43.33% have more than 10 years of experience. This composition reflects the diversity of experience levels, which can enrich discussions and collaborations between participants during the training.

Working Hours

43.33% 28.33% 71.67%

■ Masa Kerja ■ <5 Tahun ■ 5-10 Tahun ■ 10 Tahun<
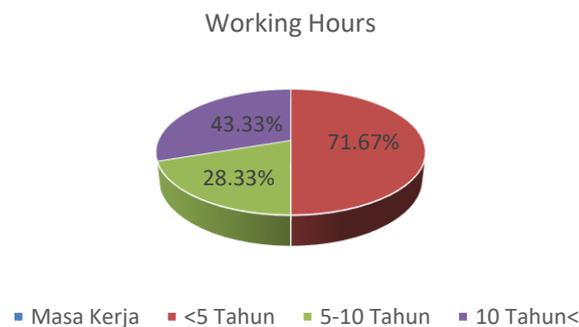
Picture 2. Workshop Participants' working hours

Meanwhile, the origin of the participant's school from State Senior High School as much as 35%, Private Senior High School consisting of 36.67% and Madrasah Aliyah as much as 28.33% as shown in Figure 3. Participants came from various types of institutions, namely State Senior High School (35%), Private Senior High School (36.67%), and Madrasah Aliyah (28.33%). This fairly even distribution provides a broad perspective on learning practices in various school settings. These differences in institutional context have the potential to encourage the adoption of more adaptive and contextual in-depth learning strategies.
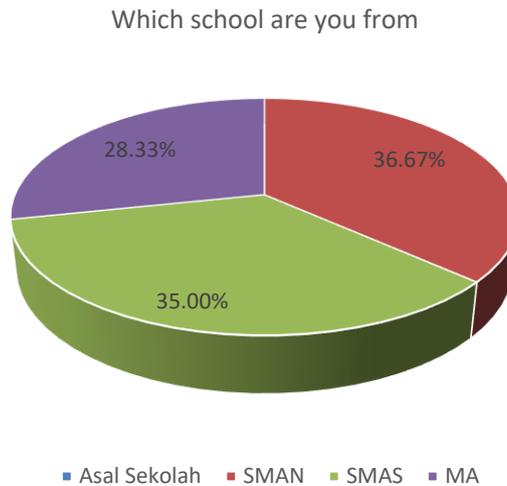
Which school are you from

Figure 3. Origin of participant schools

Based on Figure 4. as many as 60% of participants have not attended Teacher Professional Education (PPG), while 40% have attended. This data shows the importance of providing alternative training such as this workshop to strengthen pedagogical competence, especially for teachers who have not received access to formal training such as PPG.
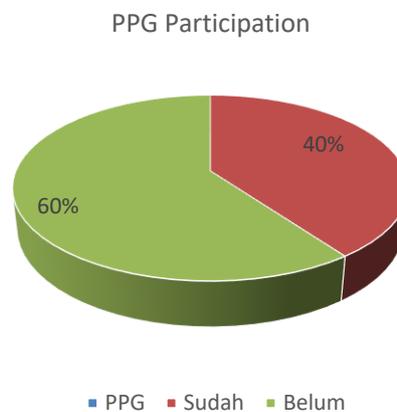
PPG Participation

Figure 4. PPG participation

As for the pre-assessment, it was found that the participants' understanding of deep learning is shown in Figure 5. As many as 43% of participants stated that they had heard the term Deep Learning, but only 32% admitted that they understood the concept, and 25% did not know at all. This finding indicates that there is still a gap in understanding the Deep Learning approach. This workshop thus becomes a strategic

means to equip teachers with deeper and more applicable knowledge about the concept.
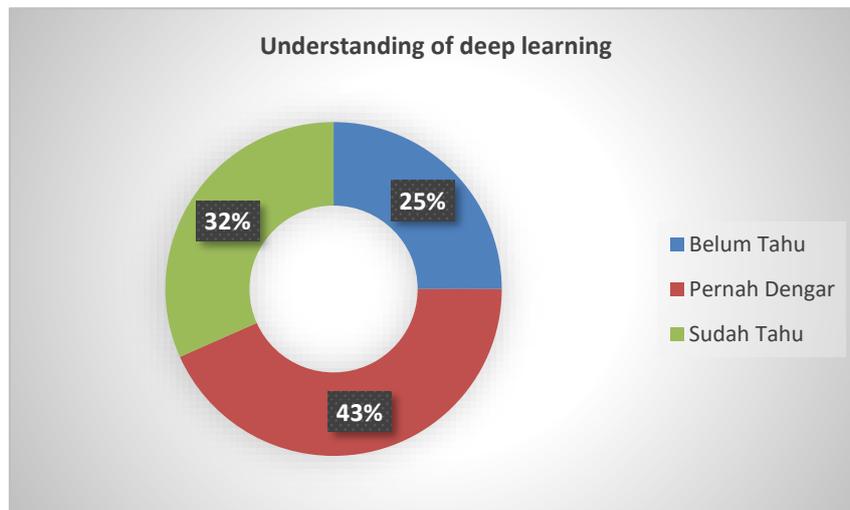

Figure 5. Participants' understanding of deep learning

In terms of awareness of the importance of value education, 37% of participants considered it important, 18% were neutral, and 22% considered it unimportant (Figure 6.). The fact that almost a quarter of participants have not realized the urgency of value education emphasizes the need for a transformational approach in this training. Education on the importance of forming students' character and integrity is fundamental in realizing the profile of Pancasila students.
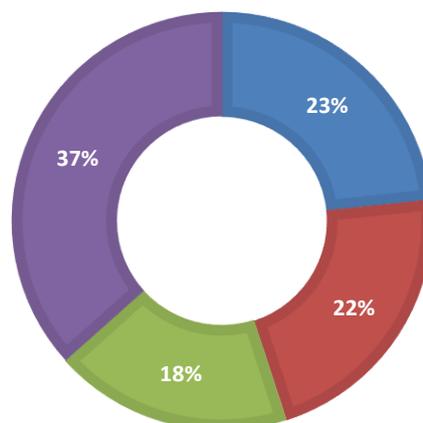

Figure 6. Awareness of the importance of value education

In terms of integrating 21st-century skills, as shown in Figure 7, the level of practice remains evenly divided: 34% of participants have never implemented it, 33% do so occasionally, and only 33% always implement it. This suggests that, although an understanding of the importance of 21st-century skills is beginning to emerge, consistent implementation in the classroom remains a significant challenge.
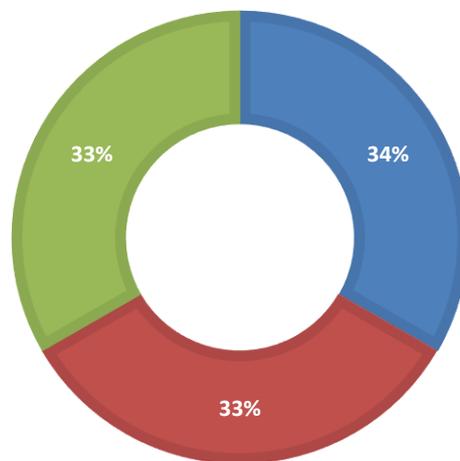

Figure 7. Integration of 21st Century skills

Participant observation was conducted by the facilitator team during the workshop to record and analyze participant participation behavior, collaborative interactions, and initiatives in group discussions. This observation aims to gain deeper insight into the dynamics of participants in responding to the training materials and methods provided.

Key Findings from Observations:

1. Active Participation: Most participants showed active participation, with 75% of them actively asking questions and putting forward new ideas during group discussions.
2. Collaborative Interaction: Collaboration between participants was very good, with 80% of participants involved in group discussions and providing constructive input to each other.
3. Individual Initiative: As many as 60% of participants took the initiative to introduce new approaches in their lesson plans, as well as demonstrating the ability to connect theory with practice.

Lesson Plan Assessment

The following are the assessment results related to the learning approach and scores obtained on each topic with lesson plan sources prepared by participants which are summarized in Table 2.

Table 2. Summary of Participant RPP Analysis

Topic	Approach	Value/4C	Average score
Respiratory System	PBL, ethical values	☑	5
Immune System	Deep Learning, interview	☑	5
Global warming	Case studies and reflections	☑	5
Movement System	Religiosity and X-rays	☑	5
Coordination System	Simulation project	☑	5
Ecosystem	Strong content, weak values	◯	4
Reproduction	PBL, gametogenesis	☑	5
Biotic-Abiotic Factors	Technical, high tech	◯	4
Viruses & Life	Problem-based, collaboration	☑	4
Teacher Learning Community	Not a student lesson plan	–	–

Instrument Triangulation

The data triangulation approach was used to strengthen the findings from the questionnaire, RPP assessment rubric, and participant observation. This triangulation aims to combine qualitative and quantitative data to obtain a more comprehensive picture of the effectiveness of training in building teacher capacity. The following is an explanation of the triangulation carried out:

Instruments used in Triangulation:

1. Questionnaire: Quantitative data that measures the level of understanding and familiarity of participants with in-depth learning, values, and 21st century skills.

2. RPP Assessment Rubric: Assessment of participants' work in the form of RPPs prepared during the workshop, which are assessed based on indicators of in-depth learning, values, and 21st century skills.
3. Participatory Observation: Observation of participant interactions during the workshop that provides qualitative data on learning dynamics and participant involvement.

Triangulation Process:

Data obtained from the three instruments are combined to:

1. Verification and validation: Ensure that the findings from one instrument are consistent with data from other instruments.
2. Correlation of results: Assess whether the results of the questionnaire, RPP assessment, and observations show consistency in describing changes in teacher capacity.

Visualization of Triangulation Results

The following is a visualization of triangulation data to illustrate the findings from the three instruments used (Figure 8.).
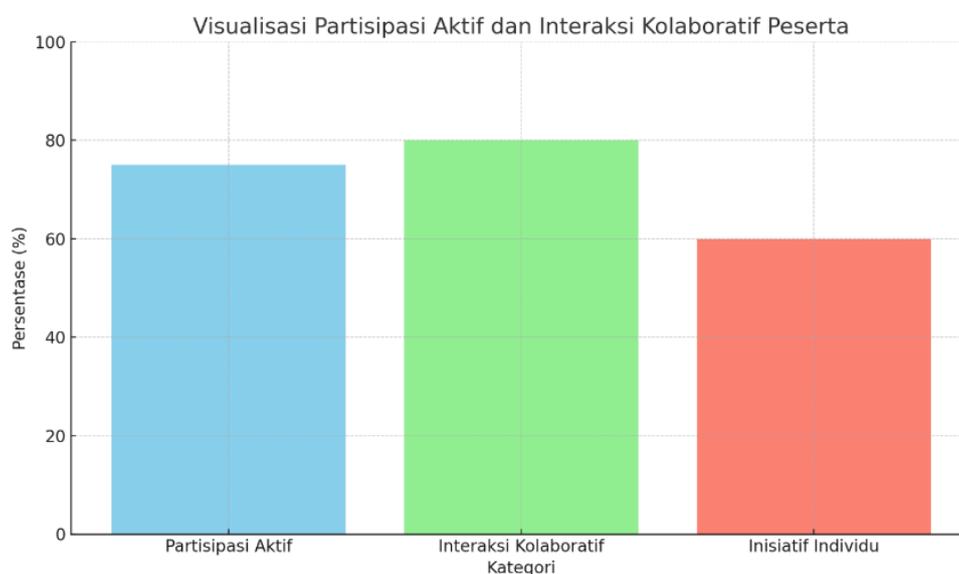

Figure 8. Participant participation and interaction

Table 3. below presents the relationship between the questionnaire results, RPP assessment, and observations that show consistent improvements in each aspect.

Table 3. Data Triangulation

Aspect	Questionnaire Results	RPP Assessment	Participatory Observation
Understanding Deep Learning	4,2	5	4,5
Value Integration	4	5	4,8
21st Century Skills	4,1	5	4,6

Discussion

Participant Questionnaire Results

Questionnaire data obtained from 60 Biology teachers participating in the workshop showed that the majority of teachers had a basic understanding of the concept of deep learning, value education, and the eight dimensions of the Pancasila student profile. The average score for understanding the concept of deep learning was 4 on a scale of 5, with most teachers assessing themselves as having a good understanding of this concept. This finding suggests that the workshop played a role in strengthening teachers' beliefs and knowledge of innovative learning approaches[16]. However, teachers also reported several barriers to implementation, such as limited school facilities and teaching time. This is consistent with research by Whitaker (1998) and Avdeenko (2020) which revealed that limited infrastructure is a major obstacle to the implementation of learning innovations in schools [17].

Segmentation and Trends

Segmentation analysis based on gender and PPG status shows that all female respondents and those who have participated in PPG have a high average understanding and familiarity with the topic of in-depth learning and the profile of Pancasila learners. In addition, teachers with more than 10 years of service showed higher understanding scores than teachers with shorter service periods. This trend suggests that teaching

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[16] Helen Beetham and Rhona Sharpe, *Rethinking Pedagogy for a Digital Age*, ed. Helen Beetham and Rhona Sharpe (Routledge, 2013), accessed April 15, 2025, https://www.taylorfrancis.com/books/edit/10.4324/9780203078952/rethinking-pedagogy-digital-age-helen-beetham-rhona-sharpe; R Indriani and Y Ibrahim, "Tolerance Character Building for Elementary School Learners through Mathematics Learning," *Journal of Social transformation and …* (2021), http://journals.theapra.org/index.php/jste/article/download/35/24; A Syamsuddin, R Babo, and S Rahman, "Mathematics Learning Interest of Students Based on the Difference in the Implementation of Model of Thematic Learning and Character-Integrated Thematic Learning.," *… Journal of Educational Research* (2021), https://files.eric.ed.gov/fulltext/EJ1294539.pdf.

[17] Nadezhda Avdeenko, "Teachers' Beliefs About Barriers Towards Implementation Of Innovative Teaching Practices," 2020, 1443–1447; Kathryn S. Whitaker, "Implementation Processes, Structures, and Barriers to High School Restructuring: A Case Study," *Journal of School Leadership* 8, no. 6 (November 1, 1998): 504–532.

experience and formal training have a positive impact on teachers' pedagogical readiness to implement values-based learning approaches and critical thinking [18].

Analysis of Participant Lesson Plans

Participant lesson plan documents were analyzed using an assessment rubric based on value integration, in-depth learning, and 4C competencies. Lesson plans that display a strong connection between Biology content and life values such as empathy, responsibility, and discussions of science ethics were 80%. The learning approaches used included Project-Based Learning, Problem-Based Learning, and contextual discussions. This approach has been proven to theoretically support active student involvement and encourage character formation and critical reasoning skills [19]. This also shows the ability of participants to translate the eight dimensions of the graduate profile into learning practices.

Table 4. Average DL Score and Familiarity Based on Obstacles

Obstacle	Skor DL rate-rate	Profile Familiarity Score	Number of Teachers
Limited school facilities	3.5	3.83	60%
Lack of time	4.0	3.67	30%
Lack of understanding of concepts	3.0	4.0	10%

Based on Table 4. it shows the average score obtained in terms of understanding Deep Learning (DL Score) and familiarity with the Pancasila Student Profile (Familiarity Score as Profile) from the number of teachers who identified each obstacle. Limited school facilities are a inhibiting factor for teachers in implementing deep learning, although this does not completely hinder the understanding and implementation of DL.

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[18] Chai, Koh, and Tsai, *A Review of Technological Pedagogical Content Knowledge*, vol. 16, p. ; Bambang Ismanto, "Determining Pedagogic And Professional Competencies Among Students In Realizing Society 5.0," *ECONOMICA* 8, no. 1 (October 31, 2019): 20–27.

[19] Hmelo-Silver, "Problem-Based Learning: What and How Do Students Learn?"; Ademiotan M. Laleye, "Practical and Technological Skills: An Inevitable Social Engineering Tool for Sustainable Development," *European Journal of Education and Pedagogy* 3, no. 2 (April 24, 2022): 171–177; M Amin, S Mahanal, and F Rohman, "Analyzing the Contribution of Critical Thinking Skills and Social Skills on Students' Character by Applying Discovery Learning Models," *… Journal of …* (2022), https://archive.conscientiabeam.com/index.php/61/article/download/2907/4534; Cretu, "Fostering 21st Century Skills For Future Teachers"; Eko Susetyarini and Ahmad Fauzi, "Trend of Critical Thinking Skill Researches in Biology Education Journals across Indonesia: From Research Design to Data Analysis," *International Journal of Instruction* 13, no. 1 (2020): 535–550.

Despite the limited facilities, teachers who face this obstacle have a fairly good level of familiarity with the Pancasila Student Profile, with a score of 3.83, indicating that despite the lack of facilities, they can still associate learning with greater values.

Meanwhile, the obstacle of lack of time is a significant obstacle, but the DL score obtained is relatively higher (4.0) compared to familiarity with the Pancasila Student Profile. This shows that despite limited time, teachers have a better understanding of deep learning. However, the obstacle of lack of conceptual understanding was only experienced by a few teachers when compared to the understanding of the concept of Deep Learning (lowest DL score: 3.0. Despite the obstacle of conceptual understanding, a small number of these teachers had quite good familiarity with the Pancasila Student Profile (score 4.0), which shows that even though they have difficulty understanding DL, they still realize the importance of integrating graduate profiles in learning.

Therefore, limited facilities and lack of time are the most common obstacles faced by teachers, with the greatest impact on their ability to apply Deep Learning in learning. However, teachers showed a fairly good understanding of the Graduate Profile Dimensions. Overall, structural barriers (such as facilities and time) influenced the implementation of DL more than the understanding of the graduate profile dimensions.

Based on the discussion above, especially the analysis of the obstacles faced by teachers in integrating Deep Learning (DL), value education, and 21st century skills, as well as the eight dimensions of the Graduate Profile, the following is a recommendation for training syntax to improve comprehensive understanding and implementation for teachers. This training aims to overcome the obstacles faced, facilitate practical application, and increase its impact on learning.

Recommended Training Syntax for Teachers

This training program is designed to equip Biology teachers with the Deep Learning (DL) approach, integration of values education, and strengthening of 21st century skills. The training lasts for three days with a blended learning format, combining theory and practice, and evaluation through pre-tests and post-tests. The first day focuses on understanding the concept of Deep Learning in education and its application to Biology topics such as the respiratory system, ecosystems, and reproduction. Teachers are invited to analyze real cases, discuss, and design project-based learning to explore the topic. The second day focuses on the integration of values education in Biology learning. Through exercises and simulations, teachers design learning activities that instill social responsibility, empathy, justice, and ethics—for example on the topics of biotechnology and cloning. The third day is directed at strengthening the 4C skills—collaboration, communication, creativity, and critical thinking. Teachers are given training in the use of technology such as Google Classroom, Padlet, and digital concept maps. The session closes with time management strategies in teaching and evaluation of authentic project-

based learning and reflective feedback between teachers. The training design is as shown in Figure 9 below.

Figure 9. Recommended Training Syntax for Teachers

Conclusion

The implementation of an integrative workshop that carries the concept of deep learning, value education, and 21st century skills has been proven to have a positive impact on building the pedagogical capacity of high school biology teachers, especially in Cirebon Regency. This activity not only improves teachers' conceptual understanding of the transformative learning approach, but also produces real implementation in the form of lesson plans that are oriented towards the formation of eight dimensions of the Pancasila Student Profile. Based on the results of the questionnaire, segmentation analysis, and product assessment and participatory observation, it can be seen that teachers are able to adapt a learning approach that emphasizes values, context, and active student participation. The obstacles faced, such as limited facilities, limited time, and lack of initial understanding, can be overcome with appropriate, collaborative, and applicable training strategies. Through the integration of various approaches such as project-based learning, problem-based learning, case studies, and value discussions, teachers not only become conveyors of material, but also facilitators of meaning and values in learning. However, it should be noted that the limitations in the implementation of this activity also

affect the results achieved. One of them is the limited time to explore deeper and more challenging concepts, such as the value approach in Biology learning. In addition, limited facilities in some schools also have an impact on difficulties in implementing technology and access to richer resources. However, teachers involved in this workshop showed a high commitment to overcome these obstacles and continue to apply what has been learned, even in less than ideal conditions. In the discussion of this article, we also noted differences in the level of understanding and application between more experienced teachers and teachers who had just joined the PPG program.

This article recommends that efforts to improve the quality of education should be directed not only at cognitive aspects, but also at strengthening character and 21st century competencies that are in line with the direction of national education transformation. Thus, training activities like this need to be replicated more widely and sustainably to create a quality, inclusive, and future-oriented education ecosystem. Despite the limitations faced, the experience gained during the workshop provides a real picture of how an integrative approach can be applied in the context of Biology learning in Indonesia.

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