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Enhancing teaching competence of prospective physical education teachers with integrated learning model

Jusuf Blegur[1,2], Amung Ma'mun[1], Berliana[1], Agus Mahendra[1]*, Rafdlal Saeful Bakhri[3], Buena D. Calunsag[4]
[1]Universitas Pendidikan Indonesia, Indonesia
[2]Universitas Kristen Artha Wacana, Indonesia
[3]Sekolah Tinggi Keguruan dan Ilmu Pendidikan Bina Mutiara, Indonesia
[4]J.H Cerilles State College, Philippines
*Corresponding Author: agus_mahendra@upi.edu

ABSTRACT

Learning continuously evolves, propelled by advancements in science and technology as well as the shifting needs and preferences of students. A critical question arises: Are prospective teachers adequately prepared to adapt to these evolving demands with the necessary competencies? This study addresses this question by investigating the effectiveness of an Integrated Learning Model (ILM) in enhancing key teaching competencies. The research focuses on teaching skills, analytical thinking abilities, academic integrity, and transformational leadership qualities among prospective teachers. The study employs an experimental research design, utilizing a one-group pre-test-post-test methodology to assess the impact of the ILM on 35 students selected through cluster sampling. Data collection instruments included the TPOG for evaluating teaching skills, the ATSI for assessing analytical thinking, the PAAIS-24 for measuring academic integrity, and the GTLS for gauging transformational leadership abilities. The data analysis involved descriptive statistics, paired samples t-tests, and N-gain score analysis. The results indicate a significant positive effect of the ILM on all measured competencies: teaching skills, analytical thinking skills, academic integrity, and transformational leadership. These findings underscore the ILM's potential as a robust framework for developing the competencies necessary for prospective teachers to meet the challenges of modern education. The study suggests that future research should explore the application of ILM in various social contexts, examine its effectiveness in fostering additional relevant competencies, and compare its outcomes with those of other instructional models. Such investigations will contribute to a deeper understanding of ILM's role in preparing teachers for the demands of 21st-century education.

Keywords: integrated learning model, teaching skills, analytical thinking, academic integrity, transformational leadership

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INTRODUCTION

Competence is a critical determinant of an individual's success in performing work-related tasks (Boulter et al., 2003; Gilley et al., 2009; Siri et al., 2020). Similarly, teacher competence plays a pivotal role in shaping the quality of teaching and, consequently, student learning outcomes (Baumgartner, 2022; Fauth et al., 2019; Holzberger et al., 2013). The establishment of teacher competency standards is essential for both prospective and practicing teachers (Makorohim et al., 2022), as these standards are foundational for effectively guiding students in

enhancing their knowledge, attitudes, and skills in both theoretical and practical aspects of education praktik (Cruz, 2022; Daga et al., 2023). Teacher competence is demonstrated through their ability to design and implement learning approaches, methods, and strategies that are both effective and efficient. This competence is reflected in their expertise, personal qualities, and social interactions, all of which contribute to maximizing students' potential. By doing so, teachers not only prepare their students to succeed academically but also equip them with the skills and resilience needed to navigate their present and future lives (Blegur et al., 2017; Francesco et al., 2019). Students taught by competent physical education (PE) teachers exhibit superior academic performance compared to those instructed by less competent teachers (Barineka Nbina, 2012), a difference that extends to areas such as memory training (Arban et al., 2023). However, the competence of today's teachers does not guarantee future competence, as they continuously encounter evolving educational demands and progressively shifting student learning needs. Therefore, for teachers to maintain and ensure their competence, it is essential to regularly update their skills, enabling them to remain adaptable and responsive to their students' learning requirements. This ongoing challenge underscores the significance of teacher competence in student learning progress, a topic that has been a central focus of educational research over the years (Blömeke et al., 2022; Kaiser & König, 2020).

Universities are actively engaged in preparing prospective teachers to be competent in their future roles, particularly when teaching in schools (Blegur, Ma'mun, Berliana, Mahendra, & Layao, 2024). For example, a study by Makorohim et al. (2022) revealed that the readiness of prospective teachers to become competent PE teachers reached 84%. However, these expectations do not always translate seamlessly into the professional environment. Several gaps can be observed when these prospective teachers transition into their teaching careers. One significant factor influencing teacher competence is the disparity between different regions, school accreditations, and school statuses. Teachers in urban areas generally demonstrate higher competence levels than those in rural settings. Similarly, teachers at accredited schools tend to be more competent than their counterparts at unaccredited institutions. Another intriguing finding is that teachers in private schools often exhibit greater competence than those in public schools (Daga et al., 2023). Second, teacher competence often falls short of expectations. For instance, the average pedagogical competence score of many teachers remains relatively low (Hastuti et al., 2022). Third, teacher adaptation to implementing contemporary learning models, such as Problem-Based Learning (PBL), is insufficient, with only 49.7% effectively integrating this model into their teaching practices (Safi'i et al., 2023). Fourth, teachers continue to struggle with optimizing student practice strategies and appropriately distributing teaching tasks according to individual student abilities (Blegur, Lumba, et al., 2023). Fifth, teachers have not treated students equally, resulting in students developing more negative attitudes towards PE. This teacher behavior causes students to prefer play and game activities over studying PE as a subject (Aga, 2022).

Teachers have a responsibility to be attentive to everything that occurs in the classroom to effectively support student development. Therefore, to successfully engage with and manage the classroom while ensuring that learning objectives are clearly communicated, teachers must be supported by strong competencies and high-performance levels (Aindra et al., 2022; Siri et al., 2020). Field-specific expertise, research competencies, curriculum and pedagogical knowledge, lifelong learning abilities, socio-cultural understanding, emotional intelligence, personality development, professional standards, communication skills, information and communication technology (ICT) proficiency, and environmental awareness are all significant contributors to 21st-century skills (Ballová Mikušková et al., 2024; Selvi, 2010; Sulaiman & Ismail, 2020; Zamora & Zamora, 2022). An interesting note regarding the competencies listed above is how universities prepare prospective teachers to ensure they continuously develop their teaching competencies throughout their careers. This process can actively and periodically affirm their ability to transform other competencies in support of enhancing their teaching skills. Currently, several learning models have been implemented to improve the competencies of prospective teachers. However, these models—such as the Case-Based Learning Model, the Innovative Micro Model, the Learner-Centered Micro-Teaching Model, the Practicum-Based Microteaching

Model, the Tadaluring Microteaching Model, and the Microteaching Learning Model Based on Experiential Learning—remain focused primarily on pedagogical competence (Hastuti et al., 2022; Zulaeha & Luriawati, 2010) and teaching skills (Arifmiboy et al., 2018; Kiliç, 2010; Nasar et al., 2020; Nasar & Kaleka, 2020; Supiyanto et al., 2021; Tambak & Sukenti, 2024; Zhang & Cheng, 2011).

A well-structured educational process will produce teachers with strong competencies (Julia et al., 2020). This leads to the question: What type of educational process can be considered effective in producing well-competent prospective teachers? We project that a good education system is one that can prepare prospective teachers to adapt to various advancements over time. This conclusion is supported by the fact that prospective teachers are continuously confronted with the rapidly changing landscape of education and the swift development of technology. Therefore, the education system must equip prospective teachers with the skills and technologies they need to successfully deliver 21st-century education (Culajara, 2023; Varas et al., 2023). To achieve this, it is crucial to explore all aspects of prospective teachers' competencies and the factors that determine their success, including pioneering new teaching models (Huang et al., 2020) and integrating new variables that support their ability to adapt. This study communicates two primary innovations. First, we experimented with the Integrated Learning Model (ILM), recently developed by Blegur, Ma'mun, Berliana, Mahendra, Alif, et al. (2024), which emphasizes eight syntaxes (orientation-reward). The ILM is based on goal-setting theory (Locke & Latham, 1990, 1991, 2002, 2006, 2019), constructivist learning theory (Huang, 2002; Mayombe, 2020), and transformative learning theory (Mezirow, 1997, 2018), with the aim of training teaching competencies in prospective teachers during micro-teaching courses. Unfortunately, the ILM has not yet undergone empirical testing in classroom settings, prompting us to address this gap by evaluating its significance in an empirical context. Second, we propose a set of "predictive" skills variables that support the ongoing cycle of teaching competency development in prospective teachers: teaching skills, analytical thinking skills, academic integrity, and transformational leadership. These variables have been synthesized into essential competencies for prospective teachers to support their self-development within the realms of education and teaching. However, these competencies are often overlooked in various micro-teaching studies.

Ultimately, the primary objective of this work is to examine the impact of the ILM on enhancing the teaching competencies of prospective physical education teachers, specifically across the variables of teaching skills, analytical thinking skills, academic integrity, and transformational leadership.

METHOD

Design and Procedure

This study adopted a one-group pre-test-post-test design as outlined by Fraenkel et al. (2011) to evaluate the significance of the ILM on four dependent variables (teaching competencies), specifically teaching skills, analytical thinking skills, academic integrity, and transformational leadership. Further, Fraenkel et al. (2011) described that in a one-group pre-test-post-test design, a single group is measured or observed not only after receiving an intervention but also before it (see Table 1).

Initially, the researcher collected pre-test data from the four independent variables. Specifically, the researcher collected data on teaching skills using 19 items from the Teaching Performance Observation Guidelines developed by Maksum (2012), which were validated by Lumba et al. (2021); collected data on analytical thinking skills using nine items from the Analytical Thinking Skills Instrument (ATSI) (Blegur, Mahendra, et al., 2023); collected data on academic integrity using 24 items from the Peer-Assessment Academic Integrity Scale (PAAIS-24) (Blegur, Subarjah, et al., 2024); and gathered data on transformational leadership using seven items from the Global Transformational Leadership Scale (GTLS) (Mahardika et al., 2024).

The researcher then applied the ILM. The ILM has an Aiken validity value ranging from 0.75 to 1.00, with a Cronbach's alpha (α) of 0.931, and an Intraclass Correlation Coefficient (ICC)

of 0.573. The loading factor for the 25 performance tasks ranges from 0.709 to 0.874, with α values ranging from 0.768 to 0.880, composite reliability values ranging from 0.768 to 0.879, Average Variance Extracted (AVE) values ranging from 0.580 to 0.649, and discriminant validity values ranging from 0.761 to 0.806. The model's Goodness of Fit (GoF) test showed that the Chi-Square/df value is 2.254, the RMSEA value is 0.061, the SRMR value is 0.036, the NFI value is 0.910, the TLI value is 0.936, and the CFI value is 0.948. Meanwhile, the results of the concurrent validation with 30 students, 28 lecturers, and 49 teachers confirmed that $\alpha = 0.098$, indicating that there is no significant difference among the three sample groups regarding the 25 performance tasks in the ILM (Blegur, Ma'mun, Berliana, Mahendra, Alif, et al., 2024).

After the ILM intervention concluded, the researcher collected data again (post-test) on the four dependent variables using the same instruments as in the pre-test. This means that in the post-test, the variables and research instruments remained unchanged. These two sets of data (pre-test and post-test) were used as the basis for statistical testing (hypothesis testing) to evaluate the impact of the ILM implementation on students' teaching skills, analytical thinking skills, academic integrity, and transformational leadership.

Table 1. One-group pre-test-post-test design

O^1	X	O^2
Pre-test	Treatment	Post-test
19 items Teaching Performance Observation Guidelines, 9 items for Analytical Thinking Skills Instrument, 24 items for Peer-Assessment Academic Integrity Scale (PAAIS-24), 7 items for Global Transformational Leadership Scale Dependent variable	Implementing an integrated learning model for 16 meetings	19 items Teaching Performance Observation Guidelines, 9 items for Analytical Thinking Skills Instrument, 24 items for Peer-Assessment Academic Integrity Scale (PAAIS-24), 7 items for Global Transformational Leadership Scale Dependent variable

Sample

The researcher collected data on the four research variables from 35 respondents, consisting of 29 men and 6 women (M±SD age = 21.9±1.5). They were sixth-semester students of the Physical Education, Health, and Recreation Study Program, Faculty of Teacher Training and Education, Universitas Kristen Artha Wacana, selected using a cluster random sampling technique.

Instrument

The researcher collected data on the teaching skills variable (from students' teaching video recordings) using the Teaching Performance Observation Guidelines developed by Maksum (2012), which have a Cronbach's alpha value of 0.971 (Lumba et al., 2021). These observation guidelines consist of 19 Guttman scale items, covering three introductory activities (items 1-3), including *"The teacher clearly communicates learning objectives to students"*; 12 core activities (items 4-15), including *"The teacher applies a modified approach"* and "*The teacher breaks down the teaching assignments according to the students' abilities"*; and four closing activities (items 16-19), including *"The teacher invites students to reflect on the overall teaching assignment"*

The data on analytical thinking skills were collected using the Analytical Thinking Skills Instrument (ATSI) (Blegur, Mahendra, et al., 2023). The ATSI has undergone validation tests, including Aiken's validity (0.86-0.97), exploratory factor analysis (EFA) (0.576-0.922), item difficulty (0.558-0.750), item discrimination (0.584-0.753), and Cronbach's alpha reliability (0.785-0.808). The nine essay questions (ATSI) were constructed using three main indicators: differentiating (three items, numbers 1-3), including *"What are the suitable strategies to improve your teaching skills during the Micro Teaching class?*"; organizing (three items, numbers 4-6), including *"How do analytical thinking skills contribute to improving your teaching skills?"*; and

attributing (three items, numbers 7-9), including *"Once you've put your teaching skills into practice, how will your strategy reflect peer input as you improve your teaching skills?"*

The data on academic integrity were collected using the Peer-Assessment Academic Integrity Scale (PAAIS-24) (Blegur, Subarjah, et al., 2024). The PAAIS-24 has an Aiken validity value of >0.80, a discriminant index value of >0.50, EFA and CFA loading factor values of >0.50, and a Cronbach's alpha value of 0.95. The six PAAIS-24 indicators were developed based on the fundamental values of academic integrity from the International Centre for Academic Integrity (2021), including honesty (items 1-4), including "*Lecturers who behave fairly when assessing my academic performance inspire me to be honest when conducting peer assessments*," the trust indicator items 5-8, including "*Peer assessments conducted using objective information can help peers improve their academic performance*," fairness indicator items 9-12, including "*I can be fair in carrying out peer assessments*," respect indicators items 13-16, including "*I discuss with lecturers and colleagues if there are differences of opinion in carrying out peer assessments*," responsibility indicators items 17-20, including "*I am responsible for providing correct information to colleagues who ask questions during group discussions*," dan indikator courage item 21-24, termasuk "*I am committed to supporting objective peer-review decisions to improve student academic performance*." Respondents answered the PAAIS-24 using a five-point Likert scale (strongly disagree to strongly agree).

Finally, data on transformational leadership were collected using the Global Transformational Leadership Scale (GTLS) (Carless et al., 2000). The GTLS consists of seven items representing seven indicators: vision, staff development, supportive, empowerment, innovative, led by example, and charismatic. Mahardika et al. (2024) conducted a Cross-cultural Adaptation study of the GTLS with 297 Indonesian students, meeting Aiken testing parameters (0.74-0.96), construct validity (discriminant index = 0.59-0.70; factor loading = 0.63-0.77; p-value = 0.000; RMR = 0.013; GFI = 0.961; TLI = 0.952; CFI = 0.968; RMSEA = 0.080), concurrent validity (r = 0.467), and Cronbach's alpha reliability (0.87). Respondents answered the GTLS using a five-point Likert scale (always-never).

Data Analysis

The results of the data collection (pre-test and post-test) for the four research variables were then analyzed descriptively and using paired samples tests to examine the impact of ILM implementation on teacher candidates' competencies (teaching skills, analytical thinking skills, academic integrity, and transformational leadership). Before conducting the paired statistical analysis, the eight data groups (pre-test and post-test) were first tested for normality. According to the paired samples test, if the Sig. value is <0.05, there is a significant effect of ILM implementation on teacher candidates' competencies; otherwise, there is no significant effect. The effectiveness of ILM implementation was further evaluated using the N-Gain formula from Hake (1999), with criteria: (a) high category with (<g>) >0.7; (b) medium category with 0.7 > (<g>) >0.3; and (c) low category with (<g>) <0.3. All data collection and quantitative analysis processes were supported by Google Forms, Microsoft Excel, and SPSS version 29.

FINDINGS AND DISCUSSION

Findings

We report the results of this study using data analysis methods, with the four research variables presented sequentially, starting with descriptive analysis, followed by paired samples tests, and concluding with the N-gain score.

Teaching skill descriptive analysis

Descriptive analysis of the pre-test for the teaching skills variable revealed that out of 19 skills, the skills that students fully succeeded in (100%) during their teaching activities were *"The teacher warmed up in a guided manner", "The teacher's attention is thorough, not just focused on skilled students,"* and "*The teacher's treatment is fair, not differentiating between male and female students"* (see Figure 1). This indicates that these two skills are fundamental competencies

already possessed by the students. These skills are also relatively easy to perform because warming up is a common protocol required for anyone engaging in physical activities, whether in educational or training settings. The fair treatment of students by the teacher occurs because the micro-teaching classes with student practitioners are relatively small, allowing for better control and distribution of teacher observations and interactions, including with both skilled and less skilled students.

Two skills that were the most challenging and were not performed at all (0%) by the students were *"The teacher clearly communicates learning objectives to students",* and *"The teacher asks questions to stimulate student reasoning"*. The data indicates that students only communicated the goals of the physical activities the students were engaged in, rather than the learning objectives. For example, they discussed the goal of kicking in a soccer game, rather than learning objectives. These skills are not based on learning objectives, which include three main areas: knowledge (e.g., training students to solve problems), attitudes (e.g., training students to be responsible), and skills (e.g., training students in manipulative movement skills). Additionally, teachers have not yet fully utilized student reasoning through real-life cases encountered during their learning experiences. For instance, asking why a pass in soccer was off-target. Although this is a simple question, it can provoke students to activate their reasoning regarding their performance.

In the post-test results, although there was a 28.6% improvement, the skill *"The teacher asks questions to stimulate students' thinking*" remained difficult to achieve. On the other hand, the teaching skills that students were able to perform included *"The teacher warmed up in a guided manner", "The teacher teaches the task of the movement in sequence*", *"The teacher breaks down the teaching assignments according to the students' abilities*", and the other four teaching skills. The post-test data also showed various improvements, with the lowest improvement (0%) in the skills *"The teacher warmed up in a guided manner", "The attention of the teacher is thorough, not just on skilled students",* and *"The teacher's treatment is fair, not differentiating between male and female students".* The highest improvement (71.4%) was observed in two teaching skills: *"The teacher reinforces nonverbal symbols",* and *"The teacher prepares students for the next lesson"* (see Figure 1). One factor contributing to the improvement in teaching skills was that, in the experimental syntax, students practiced teaching experiences through a departmentalization method, which facilitated their mastery of concepts and skills through repeated practice while constructing new experiences during the analysis and problem-solving phases.

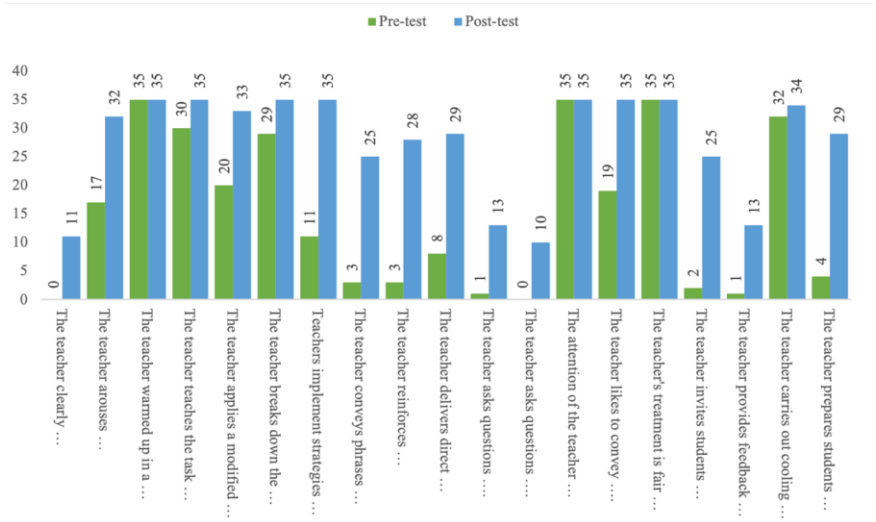

Figure 1. Teaching Skills Scores in The Pre-Test and Post-Test

Shifting to the description of the teaching skills variable, the indicator for opening the lesson in the pre-test had a mean score of 1.49±0.51, which increased to 2.23±0.55 in the post-

test. For the indicator of organizing the lesson, the pre-test score was 5.54±1.92, and it increased to 9.94±1.14 in the post-test. For the closing the lesson indicator, the pre-test score was 5.54±1.92, which decreased to 2.89±0.76 in the post-test. The paired samples test results also confirmed that the Sig. values for all three indicators were <0.05, indicating that the implementation of ILM significantly impacted the improvement of students' teaching skills, including the indicators for opening, organizing, and closing the lesson.

Table 2. Description of teaching skill indicators

No	Indicator	M±SD		Paired samples test	
		Pre-test	Post-test	t	Sig.
1	Opening the lesson	1.49±0.51	2.23±0.55	-6.273	<0.001
2	Organizing the lesson	5.54±1.92	9.94±1.14	-17.597	<0.001
3	Closing the lesson	1.11±0.58	2.89±0.76	-12.429	<0.001

Analytical thinking skills

Students have demonstrated a fundamental ability to attribute information better than the other two indicators. This is confirmed by the pre-test data, where the two items for the attributing indicator had the highest scores compared to the differentiating and organizing indicators. For example, the question *"Why is an assessment instrument needed in evaluating the teaching skills you apply?"* had the highest score of 68 (1.9±0.8), and the *item "Once you've put your teaching skills into practice, how will your strategy reflect peer input as you improve your teaching skills?"* had a score of 66 (1.9±0.8) (see Figure 2). This indicates that students have the ability to view information from different perspectives. An example of this is AUWP (male, 19 years old) responding to the question *"Why is an assessment instrument needed in evaluating the teaching skills you apply?"* with the following answer: "*Assessment instruments are needed in evaluating teaching skills because they provide a structured framework to measure various aspects of teaching skills"*. The student also highlighted that instruments are not only used as evaluation tools but are also necessary to provide a structured framework for specific work behaviors, including teaching skills

The variable of analytical thinking skills in the pre-test showed that students still faced difficulties in organizing material, particularly with the item *"How do analytical thinking skills contribute to improving your teaching skills?"* which only received a final score of 50 (1.4±0.7) (see Figure 2). This was followed by the item *"How has transformational leadership contributed to improving your teaching skills?"* This data confirms that students are still struggling with determining how an element or component functions within an informational structure. For instance, students had trouble placing transformational leadership elements in the context of enhancing their performance. An example is the response from one student, MEF (female, 23 years old), who said, *"The contribution of transformational leadership to improving teaching skills is hoped to get better*". Although this is numerical data, the student's response illustrates that students have not yet developed well-organized thinking, and thus cannot provide specific and coherent information on how transformational leadership contributes to improving their teaching skills.

The post-test data revealed that the lowest score was 84 (2.4±0.9) for the question *"Why is an assessment instrument needed in evaluating the teaching skills you apply?".* This result is consistent with the lowest improvement after the implementation of ILM, where the increase was only 11.4%. Conversely, the highest score in the post-test was for the question *"Why does a prospective educator need to master teaching skills in Micro Teaching lectures?"* with a score of 93 (2.7±1.0). However, the highest improvement was observed in the question *"How do analytical thinking skills contribute to improving your teaching skills?"* with an increase of 27.9%, followed by the question "*Why do you need a colleague of integrity to evaluate teaching skills?"* with an increase of 25% (see Figure 2).

Two main syntaxes were designed to enhance analytical thinking skills within the Integrated Learning Model: the analytical syntax and the problem-solving syntax. These syntaxes facilitated student experiences through various performance tasks, such as analyzing the teaching

performance issues of peers according to assessment instruments, conducting focus group discussions on teaching performance issues, summarizing various performance issues from instruments and focus group discussions, and collaboratively finding solutions to performance problems within each micro-teaching group, among other activities. These experiences have proven to contribute to the improvement of students' analytical thinking skills.

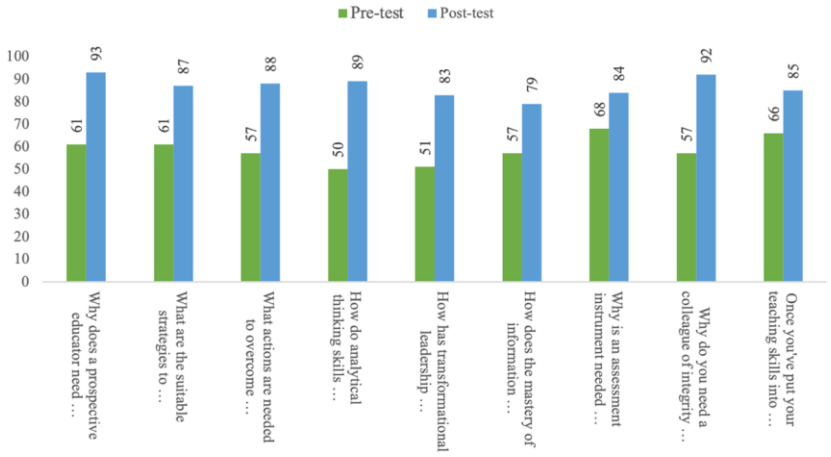

Figure 2. Analytical Thinking Skills Scores in The Pre-Test and Post-Test

For the analytical thinking skills variable, the differentiation indicator in the pre-test had a mean score of 5.11±1.30, which increased to 7.66±2.04 in the post-test. The organizing indicator had a pre-test mean score of 4.46±1.65 and increased to 7.17±2.48 in the post-test. The attributing indicator had a pre-test score of 5.46±1.42, which increased to 7.46±2.21 in the post-test. In the pre-test, students had the lowest results in the organizing indicator and the highest in the attributing indicator. In the post-test, the lowest score was in the organizing indicator, and the highest was in the differentiating indicator. The paired samples test results also confirmed that the Sig. values for all three indicators were <0.05, indicating that the implementation of ILM had a significant impact on the improvement of students' analytical thinking skills, including the differentiating, organizing, and attributing indicators (see Table 3).

Table 3. Description of analytical thinking skills indicators

No	Indicator	M±SD		Paired samples test	
		Pre-test	Post-test	t	Sig.
1	Differentiating	5.11±1.30	7.66±2.04	-9.766	<0.001
2	Organizing	4.46±1.65	7.17±2.48	-6.159	<0.001
3	Attributing	5.46±1.42	7.46±2.21	-5.032	<0.001

Academic integrity

Descriptive analysis of pre-test data for the integrity variable revealed that the highest score, 147 (4.2±0.7), was found in the honesty indicator, specifically for the statement *"Lecturers who behave fairly when assessing my academic performance inspire me to be honest when conducting peer-assessments".* Students agreed that lecturers who are fair in evaluating their academic performance serve as a model, inspiring them to practice the same fairness when assessing their peers. When teaching students, the model behavior of lecturers has a significant impact on students' integrity, particularly in the aspects of academic performance assessment and learning outcomes. Students prefer lecturers to treat them fairly based on the criteria of performance and learning outcomes, rather than experiencing biased assessments influenced by conflicts of interest. Therefore, to minimize subjective bias in grading, lecturers can provide and critically inform the indicators of academic performance assessment, thereby ensuring that the learning experience is characterized by a high level of integrity.

Data also showed that students gave the lowest response, with a score of 128 (3.7±0.8), to the statement *"I respect the results of peer-assessment of my academic performance, even if it does not meet expectations"* (see Figure 3). This fact highlights that not all students are open to and value peer assessments when the results do not meet their expectations. They still have the hope that peers 'ideally' should help them achieve the best results. However, by providing honest, fair, objective, and responsible assessments, peers are offering 'valuable assistance' for their improvement and performance enhancement. This can be critical and constructive feedback in efforts to transform student performance in future sessions, thereby increasing their chances of success. Therefore, the design of various student learning experiences should emphasize that the role of peers in peer-assessment activities is to assist improvement through honest observations, assessments, and evaluations, rather than being filled with hypocritical intrigue that does not educate students to change.

In the post-test, three statements within the honesty indicator received high responses. Firstly, the statement *"The lecturer's trust in me to assess the academic performance of my colleagues helps me improve my academic honesty"* received a score of 165 (4.7±0.5). Secondly, the statement *"Lecturers who behave fairly when assessing my academic performance inspire me to be honest when conducting peer-assessments"* scored 163 (4.7±0.5). Thirdly, similarly, the statement *"I carry out peer assessments honestly because lecturers always appreciate my every achievement"* also received a score of 163 (4.7±0.6). On the other hand, the lowest response in the post-test was for the *statement "I respect the results of peer-assessment of my academic performance, even if it does not meet expectations"* which scored 142 (4.1±0.8). Although there was an 8.0% improvement from the pre-test, this statement remained consistently the lowest-rated item in the post-test, just as it was in the pre-test.

Next, among the 24 statements on academic integrity, the statement "*Peer assessment using the instrument has more reliable results"* showed the highest increase, with a 14.3% improvement. In contrast, the statement *"I discuss with lecturers and colleagues if there are differences of opinion in carrying out peer assessments*" showed the lowest increase, at 2.3% (see Figure 3). Factors contributing to the improvement in academic integrity include students gaining direct experience analyzing their roles as *peer reviewers*, assessing their peers' teaching skills, and clarifying disagreements with peers or lecturers regarding their *peer-review* results. These experiences train students to use their authority as integrity-driven peer reviewers, as they not only analyze and assess but also present their findings for clarification by both their peers and lecturers.

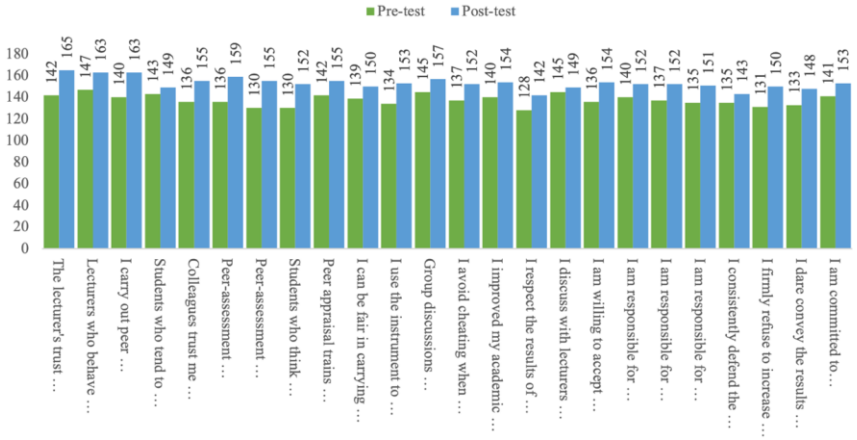

Figure 3. Academic Integrity Scores in The Pre-Test and Post-Test

In the academic integrity variable, during the pre-test, the indicator with the lowest response was trust, with a mean of 15.20±2.63, while the indicator with the highest response was honesty, with a mean of 15.20±2.63. In contrast, the post-test data showed that the indicator with the lowest response was courage, with a mean of 16.96±2.02, while the indicator with the highest

response was honesty, with a mean of 18.29±1.53. Overall, all six indicators of academic integrity showed improvement after the post-test. The highest increase after implementing the ILM was observed in the trust indicator, with a mean increase of 2.54, while the lowest increase was in the courage indicator, with a mean increase of 1.14. Additionally, the paired sample test confirmed that the significance values (Sig.) for all six indicators were <0.05, indicating that the application of ILM had a significant impact on improving students' academic integrity, including the indicators of honesty, trust, fairness, respect, responsibility, and courage (see Table 4).

Table 4. **Description of academic integrity indicators**

No	Indicator	M±SD		Paired samples test	
		Pre-test	Post-test	t	Sig.
1	Honesty	16.34±2.18	18.29±1.53	-6.226	<0.001
2	Trust	15.20±2.63	17.74±1.75	-7.615	<0.001
3	Fairness	16.00±2.14	17.57±1.74	-3.927	<0.001
4	Respect	15.71±2.02	17.06±2.11	-3.082	0.004
5	Responsibility	15.66±2.11	17.40±1.85	-4.629	<0.001
6	Courage	15.43±2.39	16.97±2.02	-3.416	0.002

Transformational leadership

In the transformational leadership variable, the pre-test data confirmed that the statement with the highest response or value was *"Well-treat the team members, support and encourage them to develop,"* with a score of 147 (4.2±0.8). This indicates that students have a fundamental basis in transformational leadership, showing high approval for the team development indicator. As leaders, they must ensure that each member receives support to develop and reach their full potential, thus contributing to the achievement of collective goals (organization). On the other hand, the statement with the lowest response was *"Communicate a clear and positive vision of the future,"* with a score of 126 (3.6±1.1). This suggests that students have not yet accustomed themselves to the leadership experience of conveying a clear and positive vision of the future to every member or team, which is crucial for reassuring members about the significance of achieving the goals and how each member can maximize their potential to achieve these objectives.

In the post-test results, the statement *"Well-treat the team members, support and encourage them to develop"* remained consistently the highest approved among the six statements, with a score of 160 (4.6±0.5) (see Figure 4), indicating a 7.4% increase from the pre-test value. This 7.4% increase also made this statement tied for the lowest increase, along with another statement: *"Instill pride and respect in others and inspire them by being highly competent."* Similarly, the lowest score in the post-test showed that students still provided a low approval rating for the statement *"Communicate a clear and positive vision of the future,"* with a score of 149 (4.3±0.8). Despite this, the statement experienced the second highest increase at 13.1%. The highest increase was seen in the statement *"Have solid values and consistently practice what is preached,"* with a value of 13.7%.

Several empirical experiences from the application of the Integrated Learning Model that contributed to the enhancement of transformational leadership include: first, students received orientation experiences related to the course goals, enabling them to articulate these into their group's objectives and/or vision. Second, students worked in heterogeneous groups and alternated roles as group coordinators, requiring them to diagnose the needs and strengths of each member to support each other in achieving a shared vision. Third, each student had the opportunity to serve as a peer reviewer, necessitating the development of trust and innovative thinking in diagnosing various limitations of their peers while offering problem-solving solutions to be used in future meetings.

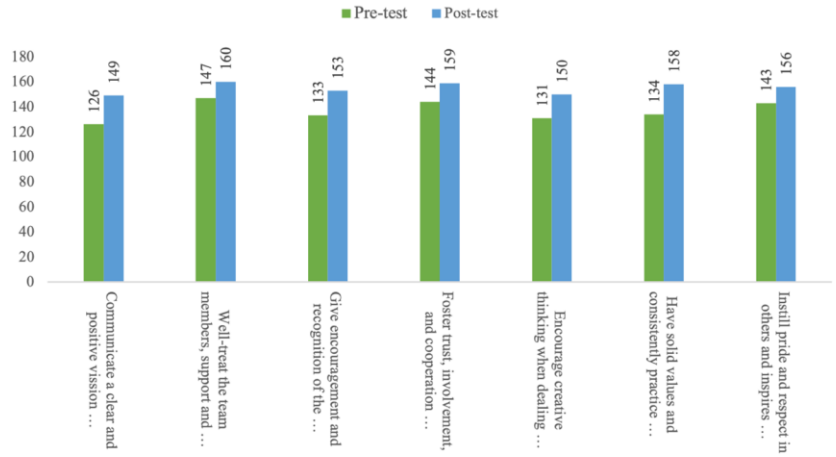

Figure 4. Transformational Leadership Scores in Pre-Test and Post-Test

In the transformational leadership variable, the pre-test results indicated that the indicator with the lowest score was "vision," with a mean of 3.60±1.09, while the indicator with the highest score was "*team development*," with a mean of 4.20±0.76. In the post-test, the "*vision*" indicator remained the lowest, with a mean of 4.26±0.82, whereas "*team development*" continued to have the highest score, with a mean of 4.57±0.50. Table 4 shows that all seven transformational leadership indicators improved after the post-test. The highest increase after the ILM implementation was observed in the "*lead by example*" indicator, with a mean increase of 0.68, while the lowest increase of 0.37 was noted in two indicators, namely "*team development*" and "*charismatic*." Additionally, the paired samples test confirmed that the significance value (Sig.) for all seven indicators was <0.05, indicating that the application of ILM significantly affected the enhancement of students' transformational leadership, including the indicators of vision, team development, supportive, empowerment, innovative thinking, led by example, and charismatic.

Table 4. Description of academic integrity indicators

No	Indicator	M±SD		Paired samples test	
		Pre-test	Post-test	t	Sig.
1	Vision	3.60±1.09	4.26±0.82	-3.683	<0.001
2	Team development	4.20±0.76	4.57±0.50	-2.721	0.010
3	Supportive	3.80±0.99	4.37±0.73	-3.095	0.004
4	Empowerment	4.11±0.87	4.54±0.56	-2.590	0.014
5	Innovative thinking	3.74±1.12	4.29±0.71	-3.092	0.004
6	Lead by example	3.83±0.98	4.51±0.61	-4.680	<0.001
7	Charismatic	4.09±1.09	4.46±0.70	-2.130	0.040

Paired Samples Test

Following the descriptive analysis and paired samples test (based on indicators per variable) as detailed in Tables 2 through 5, the researcher proceeded with the paired samples test to address the research hypothesis regarding the impact of ILM on teacher competencies. This involves examining the variables of teaching skills, analytical thinking skills, academic integrity, and transformational leadership.

Before conducting the paired samples test, the researcher first performed a normality test to confirm whether the data sets followed a normal distribution. The Shapiro-Wilk normality test results indicated that all eight data groups had a Sig. value greater than 0.05, with values ranging from 0.052 to 0.796 (see Table 6). Therefore, it was concluded that the eight data groups are normally distributed, allowing for the continuation of parametric statistical testing using the paired samples.

Table 6. Normality test (Shapiro-Wilk)

	Pre-test			Post-test		
	Statistic	df	Sig.	Statistic	df	Sig.
Teaching skills	0.950	35	0.111	0.939	35	0.052
Analytical thinking skills	0.941	35	0.062	0.981	35	0.796
Academic integrity	0.949	35	0.106	0.940	35	0.055
Transformational leadership	0.946	35	0.084	0.940	35	0.057

The results of the paired samples test confirm that the Sig. values (both one-sided and two-sided) for the four variables are all less than 0.001 (<0.05). The conclusion drawn from these statistical results is that the application of the ILM in micro-teaching significantly affects teaching skills, analytical thinking skills, academic integrity, and transformational leadership in prospective teachers.

Table 7. Paired samples test

	Paired differences		t	Significance	
	Mean	SD		One sided	Two sided
Pre-test on teaching skills - Post-test on teaching skills	-6.91429	1.61558	-25.319	<0.001	<0.001
Pre-test on analytical thinking skills - Post-test on analytical thinking skills	-7.37143	5.28085	-8.258	<0.001	<0.001
Pre-test in academic integrity-post-test on academic integrity	-10.68571	11.02610	-5.733	<0.001	<0.001
Pre-test on transformational leadership -post-test on transformational leadearship	-3.62857	3.91893	-5.478	<0.001	<0.001

N-Gain Score

The normalized gain (N-gain) test was conducted to assess the effectiveness of the integrated learning model on improving students' teaching skills by calculating the difference between pre-test and post-test scores using the formula and norms from Hake (1999). The results indicate that all indicators and the total score for teaching skills fall within the range of 0.30-0.70, which is categorized as medium. This suggests that the ILM contributed to a 63.7% improvement in teaching skills. Similarly, for the variable of analytical thinking skills, all indicators and the total score also fall within the range of 0.30-0.70, categorizing the effectiveness of the ILM on improving analytical thinking skills at 35%.

Table 8. N-Gain score for teaching competency skill variables

No	Variabel	Pre-test	Post-test	Ideal score	N-gain	Percentage	Category
1	Teaching skills	285	527	665	0.64	63.7%	Medium
2	Analytical thinking skills	522	780	1.260	0.35	35.0%	Medium
3	Academic integrity	3.302	3.676	4.200	0.09	8.9%	Low
4	Transformational leadership	958	1.085	1.225	0.10	10.4%	Low

Unlike the previous two variables or skills, the N-gain test results for the variables of academic integrity and transformational leadership show values of less than 0.30, indicating that the effectiveness of the ILM in improving academic integrity and transformational leadership is categorized as low. The detailed contribution of the ILM to academic integrity is 8.9%, and to transformational leadership is 10.4%. This does not imply that the ILM is ineffective in enhancing academic integrity and transformational leadership. Instead, it suggests that students had good pre-test scores (see Table 8), which results in a lower N-gain in the effectiveness test for these

two variables. Future research could address this issue by applying the ILM to sample groups with initially lower scores in academic integrity and transformational leadership.

Discussion

Teaching is a skill, so to improve it, students must engage in various practice experiences about teaching itself (Blegur & Lumba, 2019). Yusof et al. (2015) found that university students expect more active learning activities to maximize their engagement in teaching practice. Repeated teaching experiences make students more confident in their prospective teaching career (Gao et al., 2013). However, a recent study by Cho et al. (2024) noted that more than allowing students to teach or teach repeatedly is needed to develop their adaptive competence. They suggest integrating deliberate pedagogical strategies is essential to equip students with practical teaching skills and knowledge and to help them link theory and practice with continuous feedback and reflection. As in the syntax of the model, ILM not only provides excellent opportunities for students to engage in hands-on experiences for iterative learning through the part and whole method in small group experiential practice, but they are also given performance tasks to construct the experience and its transformative meaning by analyzing and transforming various teaching skill needs that help them to be adaptive to different students' learning needs.

To enrich the experience of demonstration, construction, and transformation of students' knowledge and skills, ILM relies on learning in small groups of 4-6 students. In addition, this model also ensures that students conduct teaching skill demonstrations in a section-by-section form (e.g., opening activities, core activities, and closing activities to increase opportunities to diagnose limitations and strengths while giving students more time to practice before moving on to the next skill stage) as has been successfully done by Blegur and Lumba (2019) or Sugihartini et al. (2020). Maximizing the collaborative role and commitment of peers as evaluators who are equipped with instruments and assessment rubrics (to facilitate intense supervision activities on teaching performance of their peers) to anticipate concerns Wang and Wang (2023) and extend the success of the study Blegur and Lumba (2022). Assigning proportional practice time for each part of the teaching skill to be practiced so that time use among all students is controlled. Students report the results of critical reflection on their teaching skill outcomes to accommodate the success of the model from Simatupang and Aryeni (2018), Sarimanah (2018), and Sophuan (2018). Lecturers' experience is more about confirming and clarifying critical notes from peer assessment of students' teaching skills as a form of supervision, as reported in the study of Yusuf et al. (2022), Suparmi (2023), and Suarniti (2023).

When looking at the performance tasks in ILM, this model allows students to connect various concepts and information from multiple disciplines to solve their teaching performance problems. Although they have been facilitated with numerous instruments, they must be analytical when observing their peers' teaching performance and providing analytical and critical notes to serve as evaluation material in the analytical and problem-solving phases. It stimulates students to memorize material, analyze and critique the information they receive, and construct a meal of new knowledge and skills. For example, in a group project that involves improving the teaching skills of their colleagues, students are required to develop a comprehensive problem-solving strategy by exploring various internal resources; they must also be able to analyze inputs from their colleagues to critically look at the relevance of these inputs to improving their colleagues' teaching performance. This process trains them to think systematically and consider various points of view before making decisions from different angles, which is the essence of analytical thinking skills.

The ILM trains students' analytical thinking through their goal orientation during their participation in the course. They not only put the problem as the analytical object but also use the end goal of the lecture so that they can autonomously construct their experience of what is vital from the skills they achieve at the end of the lecture, as well as how students build knowledge and skills to achieve it as the basis in constructivism learning, where students form and construct knowledge from their own experience (Kieu Oanh & Hong Nhung, 2022). In other words, students can transform their knowledge and skills both instrumentally, dialogically, and also self-reflectively (Kitchenham, 2008) so that even if they face problems or anomalies that cannot be

resolved with past and current experiences, they can redefine their knowledge and experiences as a process of transforming new meanings for students in achieving their goals. It means that ILM encourages students to be more active in exploring and discovering the relationship between theory and practice and can even construct new meaningful best practices through various activities such as problem orientation, discussing problem-solving and achieving performance improvement goals, comparing performance progress and identifying constructive improvement feedback, analyzing performance changes and encouraging innovation in real situations.

Academic integrity is the moral code of academia, where people produce and disseminate knowledge ethically and honestly. Academic integrity teaches individuals to adopt behaviors that promote the teaching and acquiring of new skills, learning, and values fairly and responsibly (Brown et al., 2020). Thus, in simple terms, academic integrity shows human wholeness as a person's moral attitude (morals) (Salamah & Kusumanto, 2022). Study Davis (2023) highlighted the need to revise policies to promote academic integrity as a skill. He emphasized the adoption of approaches that foster the development of a comprehensive understanding of academic integrity rather than simply preventing violations. For example, by building a teaching environment that supports academic integrity (Devika & Sheela, 2020) which is not limited to better preparing students to fulfill their academic obligations fully (Guerrero-Dib et al., 2020), practicing integrity experiences through authentic assessment (Sotiriadou et al., 2020), self-assessment (Tai & Adachi, 2019; Tammeleht & Löfström, 2023), peer assessment (Blegur, Subarjah, et al., 2024; Chauhan et al., 2018; Gillanders et al., 2020; Tai & Adachi, 2019), as well as comparing students' assessment results as well as comparing the results of student assessments with lecturer assessments (Blegur et al., 2021).

The most productive approach to addressing academic integrity issues is to create an educational environment that fosters academic integrity (Çelik & Razı, 2023; Solmon, 2018), particularly in the learning classroom (Burbidge & Hamer, 2020). The integrated learning model is proven to enhance academic integrity as it seeks to incorporate various educational approaches, such as constructivist and transformational experiences, providing students with more in-depth and meaningful experiences of performance tasks, such as self-assessments and peer assessment. In addition, ILM also familiarizes students with the importance of integrity in their learning process and how it contributes to the achievement of their study group and professional career development in the academic community. Students are entrusted with assessing the teaching performance of their peers, and students are responsible for the achievement or improvement of their peers' performance. Students are honest and respectful of every performance achieved by their peers, they are fair in treating their peers, and they dare to criticize the improvement of their peers' teaching performance and that of others. It means that the environmental setting in the integrated learning model supports students' trust in each other (ArwaArna'out, 2016) by using assessment practices (Morris, 2018), which give roles to peers (Laka & Paska, 2023).

This model also trains student integrity by considering the recommendations of the International Centre for Academic Integrity (2021) in 12 strategies for fostering academic integrity, including demonstrated competencies and learning outcomes so that students can practice, make mistakes, and learn from them. The integrated learning model has placed academic integrity as one of the components of learning outcomes so that students not only simulate but every learning behavior to improve their teaching skills must be based on academic integrity so that the results of their teaching performance have high credibility. This model is carefully designed so that academic integrity must be attractive to students and designed so that it can be effectively embedded in the curriculum (Morris, 2016) so that student integrity can be constructively and periodically manifested in the students' learning experience (Guerrero-Dib et al., 2020).

ILM innovation has been proven to have a significant effect on improving student transformational leadership. One's transformational leadership engages the ability to inspire and motivate others and encourage positive change, becoming increasingly relevant in the era of globalization and rapid change. This model has initiated the internalization of various transformational leadership approaches and methods in students' learning experiences that are goal-based, actively constructing the meaning of leadership learning experiences and reflecting

on transformational leadership experiences in order to gain new experiences about their leadership practices through specific performance tasks to improve their academic performance, their peers, and their groups through micro-teaching lectures. This model integrates transformational leadership in students' actual experiences by setting transformational leadership as one of the learning objectives (as an affection domain) so that it becomes an integral part for lecturers and students to discuss in the orientation phase so that students need to build their vision to be able to improve their transformational leadership, how to improve it (improvement strategy), and the criteria for improvement (instrumentation).

Teacher leadership suggests that teachers hold a central position in how schools operate and the core functions of teaching and learning (York-Barr & Duke, 2004). To this end, ILM encourages students to play an active role in the learning process, not only as recipients of information but also as agents of change of new information and experiences. Through an integrated learning environment, students are involved in micro-group projects that require them to build a vision, lead by empowering and supporting each other, motivate peers, develop innovative thinking when making problem-solving decisions, and develop exemplarity with their thoughts, attitudes, and performance. Thus, students gain practical experience in applying the indicators of transformational leadership in an authentic context. The author ensures that the transformational leadership experience is well simulated because prospective teacher students must prepare their capacity and knowledge through various learning experiences and exercises before they empower their students. Those who have the responsibility as transformative leaders who lead other transformative leaders, namely their students (Chitiga et al., 2023; Neophytou & Valiandesb, 2013).

So, how do these experiences manifest in student demonstrations? Researchers designed ILM into eight learning syntaxes and 25 performance tasks so that the articulated experience of transformational leadership becomes more actual and accurate. For example, in the orientation phase, students develop their vision because, as transformational leaders, they can create innovative goals, shape roles, facilitate change, increase perseverance, and model social values (Wang, 2019). Based on their vision or innovative purpose, they also inspire their members to have a shared vision targeted and performance standards set and facilitate their peers to achieve it (Anderson et al., 2017; Khan et al., 2020). Furthermore, in the distribution phase, students determine the role of each member (e.g., peer-reviewers, teachers, and students) in small groups to encourage the level of participation of members in improving their performance. In the analysis phase, students conduct focus group discussions about each student's teaching performance problems, summarizing the findings of teaching performance problems from instruments and focus group discussions. In the problem-solving phase, students jointly find solutions to solve performance problems in each group.

The above processes also mandate the importance of reflection and self-evaluation, critical elements of transformational leadership in the integrated learning model. Students are encouraged to evaluate their own critically and the team's performance and to identify areas where they can improve to achieve improvements in their teaching performance, analytical thinking, integrity, and transformational leadership (the ultimate goal in the course) so that they can construct meaning by interpreting information in the context of their own experience (Chuang, 2021; Gogus, 2012; Jemberie, 2021; Kieu Oanh & Hong Nhung, 2022). This reflection process helps them become more effective leaders and teaches them the importance of adaptability and continuous improvement. By engaging in a deep reflection process, students can develop better self-awareness, understand how their actions affect others, and influence themselves to continue to transform themselves periodically to achieve goals and meet the expectations of teaching competence as their responsibility to carry out quality learning. This attitude is essential to why transformational leadership is so important in training student teachers.

CONCLUSION

The experimental results confirm that the ILM has a significant impact on improving prospective teachers' teaching competencies, helping them to adapt to the progressively evolving

needs of the educational world. First, there was an improvement in teaching skills, with a t-value of -25.319 (Sig. = <0.001) and an N-gain of 63.7%. Second, analytical thinking skills showed an increase, with a t-value of -8.258 (Sig. = <0.001) and an N-gain of 35.7%. Third, academic integrity improved, with a t-value of -5.733 (Sig. = <0.001) and an N-gain of 8.9%. Finally, transformational leadership skills increased with a t-value of -5.478 (Sig. = <0.001) and an N-gain of 10.4%. Overall, the integrated learning model proves to be a strategic choice for educators to enhance students' transformational leadership skills in micro-teaching courses.

Given the empirical testing of this model with a limited sample and social context, specifically on sixth-semester students in Kupang, East Nusa Tenggara, Indonesia, the ILM requires further empirical validation. Future researchers could explore other potential variables not explicitly listed but highly relevant to the development of 21st-century teacher competencies. Additionally, it's worth noting that the sample already demonstrated high pre-test scores in academic integrity and transformational leadership. Future testing might address this limitation by applying ILM to sample groups with lower scores in these areas. Moreover, current empirical studies focus on *pre-test* and *post-test* experiments; future research should consider comparing ILM with other learning models to evaluate the performance tasks formulated within these models.

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