



The Analysis of Pre-Service Physics Teachers on Basic Teaching Competencies through Peer Assessment

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Abstract:

The study was intended to analyze the profile of the skills of first-year students, students, and physics teacher candidates in the physics of building lesson plan. The method used in this study is descriptive research. With research samples of class c microteaching students semester completed in 2022. In this study, data is generated from the performance of a mutual friend (mance) in the first and second cycles. Data collection techniques with observations are used using peer assessments. The assessment of the student's basic skills score for asked-teacher physics in drafting lesson plans and teaching on the first cycle is 89.5 out of 100. Then after a friendly assessment is made on cycle two, the average score is 22.6. Thus, the peer assessment could improve the purposive science teacher skills in making a lesson plan and teaching process. Moreover, the physics teacher's students already had good skills in coming up with the learning plan and implementing it by teaching

Keywords:

Teaching skills, Microteaching, Peer Assessment

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INTRODUCTION

Education is a social activity essential in human life in exploring student knowledge and skills and designing their behavior (Sukmawati, 2019). Excellent and valuable education was affected by the teacher's competencies to facilitate the student's learning goals (Ragil, 2020). The teacher has a strategic role in realizing the national development purposes, especially in education and teaching, so it is necessary to prepare the dignified and professional pre-service teacher (Apriani et al., 2020).

A teacher is a professional in charge of planning and implementing the learning process, assessing the learning result, guiding and supervising, conducting research, and helping develop school or class programs for their professionalism (Raibowo & Nopiyanto, 2020). Achievement of teacher professionalism is not instant; it needs more practice from small to big class, from closed to open practice. Pre-service teachers are prepared in microteaching classes (Al Fikri, 2021).

Micro-learning, or microteaching, is a vehicle to train readiness or hone students' teaching skills as prospective teachers (Setiawan & Mulyati, 2018). Micro teaching is a learning process that is micronized or simplified to form or develop teaching skills (Deswita, 2019). Because the learning situation is deliberately designed so it can be controlled (Sari, 2018), Microlearning can also be interpreted as practicing skills or teaching practice in a small or limited scope (Endraningsih et al., 2020). Microteaching learning is an early stage of training in shaping teaching competencies and skills through

actualizing basic teaching competencies (Suryana, 2018). However, through microteaching, student-teacher candidates prepare themselves and get real experience in practicing teaching. If the implementation of micro-teaching learning goes well, it will provide many benefits for prospective teachers (Oktafia & Nora, 2020).

A teacher needs a lesson plan and skills in teaching (Ambarawati, 2020). Students develop a lesson plan in the learning planning training (Kurniawan & Masjudin, 2018). The lesson plan is an essential guide for teachers to carry out the learning process in the classroom (Angraini et al., 2021). The lesson plan must include Competency Standards (SK) that cover KD. Part of the lesson plans are in detail: learning objectives, learning materials, learning methods, steps for learning activities, learning resources, and assessment (Ambarawati, 2020). In this case, of course, students must have an adequate understanding of various knowledge about learning theories and learning strategies.

In the learning practice, students learn many aspects, including the technical delivery of material, the use of learning methods, the service of teaching media, guiding learning, motivating, providing assessments, etc. Therefore, implementing microteaching lectures must be carried out optimally, and all supporting components in the form of books, rooms, and other facilities must be available (Kurniawan & Masjudin, 2018). In addition to lesson plans, teachers must prepare their teaching skills (Jayanti et al., 2020). The components of teaching skills that a teacher must possess are reinforcement skills, questioning skills, using variations skills, explaining skills, opening and closing lessons, small group and individual teaching skills, class management skills, and group discussion skills (Suendarti & Lestari, 2020).

In the practice of learning, efforts to realize practical teaching skills are not accessible. Moreover, learning problems are still faced with learning patterns that only encourage cognitive function. Learning is only textual or mere memorization, and it is realized that weaknesses in learning tend to be at the mindset level. It is necessary to realize that classroom management must run optimally, and teachers must have teaching skills for effective learning. With microteaching, students are expected to become teachers ready to teach and create effective practical learning.

METHODS

This research is a type of descriptive research by implementation of functions to determine independent variables, either one or more (independent) variables, without having to connecting or comparing with other variables (Tanjung et al., 2020). This study presented the data from peer assessment (performance) first and second cycle of the microteaching course, and then interpreted it.

The data collection technique in this study was observed using a peer-to-peer assessment sheet. The assessment is carried out twice or in two cycles. The first assessment is when students appear with the freedom of learning scenarios and teaching practices. The second assessment is after students receive input from the results of the first assessment from the other students. The data of the assessment results in the form of scores of students' basic teaching skills were then used as the values of basic teaching skills, which were then analyzed descriptively (descriptive statistic). The technique to decide the improvement use formula percentages correction. Conclusions are drawn in stages starting from temporary conclusions drawn at the end of the first cycle to the conclusion which are related to each other in the last cycle. The conclusion that taken include any improvements or changes that occur. Aspects and indicators of the completeness of the lesson plan are shown in Table 1.

Table 1. Aspects and indicators of lesson plan completeness

No	Aspects	Indicator
1	Learning objectives	Conformity of objectives with competency achievement indicators
2		Operational verbs used can be observed and measured
3		Learning objectives
4		Formulation of learning objectives
5	Learning materials	The suitability of learning materials with KD and indicators
6		Structure of learning materials
7		Learning materials (in the Appendix)
8	Learning strategies	Models, approaches, and learning methods
9		Steps/syntax of online/offline learning
10		Stages of learning activities
11		Application of active learning/scientific learning
12	Learning media	Selection of learning media online/offline
13	Learning resources	Selection of online learning resources
14	Evaluation	Scope of evaluation aspects
15		Appropriateness of the assessment with the objectives/indicators
16		Assessment components
17		Planning enrichment and remedial activities

Aspects and indicators of basic teaching skills or when the implementation of the learning is being studied are shown in Table 2.

Table 2. Aspects and indicators of learning implementation

No.	Aspects	Indicators
1	Opening	Prepare students physically and mentally
		Motivate students
		Delivering apperception
		Delivering learning objectives
2	Core	Delivering material coverage
		Mastery of delivering material
		Applying the concept of learning materials to life
		Methods reflect active/scientific learning
		Cultivate positive habits
		Using tools/materials and media
		Assessment of the learning process
3	Closing	Class management
		Language use
		Social sensitivity
		Personality
4	IT	Assessment of learning outcomes online
		Summarizing learning materials
5	Response	Reflect and plan follow-up
		Use of technology in learning
		Student satisfaction in learning

RESULTS & DISCUSSION

This study aims to analyze the skill profile of prospective physics teacher students in preparing lesson plans and the skills of prospective physics teacher students in teaching microteaching courses. Essential teaching skills must be trained through various existing courses to equip prospective physics teacher students before going directly to class (fundamental teaching). Essential teaching skills are helpful so that prospective physics teacher students carry out a creative, innovative, effective, and efficient physics learning process.

The assessment results in a primary teaching skill score were obtained from peer assessments carried out when performing teaching exercises. The results of a complete assessment of the average teaching skills scores for each aspect of basic teaching skills for prospective physics teacher students in microteaching courses are presented in Table 3 and Table 4.

Table 3. Physics teacher candidate skill score in preparing lesson plans

Aspects	Score		Mean
	first cycle	first cycle	
Learning objective	4.62	4.83	4.73
Learning topics	4.36	4.76	4.56
Learning strategy	4.6	4.71	4.66
Learning media	4.79	4.84	4.82
Learning resource	4.63	4.85	4.74
Evaluation	4.41	4.69	4.55

Table 4. Physics teacher candidate skill score in teaching practice

Aspects	Score		Mean
	first cycle	first cycle	
Opening	4.54	4.61	4.56
Core	4.45	4.49	4.47
Closing	4.35	4.39	4.37
IT	4.39	4.50	4.45
Responses	4.19	4.23	4.21

The description of results of the assessment for each aspect of the lesson plans and the implementation of learning for prospective physics teacher students is described in the following explanation.

Skills in preparing lesson plans

Aspects of Learning Objectives

The teacher carefully determines learning objectives in order to create meaningful learning. The components that must exist in determining the learning objectives are ABCD or Audience, Behavior, Condition, and Degree (Budiastuti et al., 2021). The explanation of the ABCD elements in the learning objectives is A = Audience (petatar, other target students), B = Behavior (observable behavior as a result of learning), C = Condition (requirements met so that the expected behavior can be achieved) and D = Degree (acceptable level of performance as a measure of student learning outcomes) (Octaviani, 2018). In this study, the skills to compose learning in lesson plans were obtained from peer

assessment conducted in 2 cycles. The results of the score of the formulation of learning objectives in the lesson plan by prospective physics teachers are shown in Table 5.

Table 5. Assessment Score of Each Indicator on Aspects of Learning Objectives first cycle and second cycle

Aspects	Indicators	Score		
		first cycle	2nd cycle	Average
Learning objective	Conformity of objectives with Competency Achievement Indicators	4.76	4.86	4.81
	Operational verbs used can be observed and measured	4.83	4.88	4.86
	Learning objective	4.56	4.79	4.68
	Formulation of learning objectives	4.33	4.79	4.56
Average		4.67	4.83	4.73

Based on the assessment results between friends for the aspect of learning objectives in Table 5, it is known that the average score for the first appearance is 4.67, while for the second cycle, it is 4.83. This score indicates increased skills in formulating learning objectives after peer assessment. The indicator with the highest score in this aspect of learning objectives is using active verbs (KKO) that can be observed and measured. At the same time, the indicator with the lowest score is regarding the formulation of learning objectives following the ABCD components (Audience, Behavior, Condition, and Degree). However, after being assessed by friends, the score of each indicator in the second cycle increased.

Aspects of Learning Materials

Permendikbud No. 69 of 2013 concerning the SMA and MA Curriculum states that the core competencies of learning materials include factual, conceptual, and procedural knowledge to be applied in the fields of technology, arts, culture, and humanities to be able to solve procedural problems in specific fields of study according to their talents and abilities. interests (Rizaldi & Syahlan, 2020). Learning materials generally consist of knowledge, skills, and attitudes that students must understand to achieve predetermined competency standards. In choosing learning materials, educators must pay attention to the principles of relevance, consistency, and adequacy (Sahabuddin & Makkasau, 2019). The following presents the results of prospective physics teachers in describing learning materials in Table 6.

Table 6. Assessment Score of Each Indicator on the Aspects of Learning Materials first cycle and second cycle

Aspects	Indicators	Score		
		first cycle	2nd cycle	Average
Learning materials	The suitability of learning materials with KD and Indicators	4.69	4.84	4.77
	Structure of learning materials	4.38	4.68	4.53
	Learning materials (in the Appendix)	4.00	4.76	4.38
Average		4.36	4.76	4.56

Based on the assessment results between friends for aspects of learning material in table 6, it is known that the average score for the first performance is 4.36, while for the second cycle, it is 4.76. This score indicates increased skills in describing learning after peer assessment. Prospective physics teachers and students can describe learning materials under essential competencies and indicators. The material is arranged according to the level of difficulty. The third indicator is attaching learning materials to the lesson plans, the majority of prospective physics teacher students in the first cycle do not attach them, but after peer assessment, the lesson plans are completed by attaching learning materials. The research shows prospective physics teacher students have good abilities in cycles 1 and 2.

Aspects of Learning Materials

Learning strategies are essential in the teaching and learning process. Learning strategy is a method or technique chosen to change students' attitudes to become critical, innovative, creative, and solutive in solving problems. Learning strategies are related to the selection of learning methods for students (Budiana et al., 2022). The following is shown in Table 7 regarding the ability scores of prospective physics teacher students in the use of learning strategies.

Table 7. Assessment Score of Each Indicator on Aspects of Learning Strategy first cycle and second cycle

Aspects	Indicators	Score		
		first cycle	first cycle	Score
Learning strategy	Models, approaches, and learning methods	4.73	4.84	4.79
	Steps/syntax of online/offline learning	4.21	4.60	4.40
	Stages of learning activities	4.44	4.66	4.56
	Application of active learning/scientific learning	4.60	4.74	4.67
Average		4.50	4.71	4.60

Based on the results of the assessment between friends for aspects of learning strategies in table 7, it is known that the average score for the first performance is 4.5, while for the second cycle, it is 4.71. This score indicates an increase in skills in deciphering learning after peer assessment. The indicator with the lowest score in the first cycle is the second indicator, namely the steps/syntax of online/offline learning. Prospective physics teacher students use varied learning models. It is just that the syntax or stages of the activities are not appropriate or appropriate.

An example is that prospective physics teacher students use the jigsaw or TGT learning model, but the syntax used is discovery learning syntax. However, after peer assessment, the prospective physics teacher student scores or scores obtained in the cycle increase. The highest score indicator in both cycles is varied models, approaches, and learning methods.

Aspects of Learning Media

Learning media has an essential role in the teaching and learning process and is a unit that cannot be separated from the world of education—learning media channels the sender's message to the recipient to stimulate students' thoughts, feelings, concerns, and

interests in learning. With the use of media, students will become more motivated to learn, encourage students to write, and speak. The more attractive the learning media used by educators, the higher the students' learning motivation level (Tafonao, 2018). The following is shown in Table 8 regarding the ability scores of prospective physics teacher students in the use of learning media.

Table 8. Assessment Score on Learning Media Aspects first cycle and second cycle

Aspects	Indicators	Score		
		first cycle	2nd cycle	Average
Learning media	Selection of online/offline learning media	4.79	4.84	4.82

Based on the results of peer assessment for aspects of the use of learning media, because the learning system is still carried out at home, the learning media used is also in the form of media that can be accessed online. In the first cycle, the learning media used by prospective physics teacher students varied greatly in the form of virtual face-to-face applications (google meet and zoom), e-modules, virtual practicum websites used by the majority using PhET Simulation, and google form link to fill in attendance, sending assignments, doing reflections, carrying out evaluations. After an assessment is made between friends, the media used by prospective physics teacher students is even more varied, such as examples of the use of e-modules using flipbooks, the use of google sites so that teaching materials, attendance, evaluations, and so on have been entered into a unit so that they are more organized. The average score for online learning media in the first cycle was 4.79 and increased in the second cycle, which was 4.84. Physics teacher candidates are good at using online learning media.

The aspect of Learning Resources

Learning resources are one of the crucial components of learning. In a book entitled *Instructional Technological: The Definition and Domains of the Field*, AECT classifies learning resources used in the learning process into six categories, namely messages, people, materials, equipment, techniques, and settings (Cahyadi, 2019). This means that learning resources can take any form. Along with the rapid development of technology, people use them as learning resources. As well as from the internet, can find the desired information. So that this learning resource serves to provide convenience in learning activities as well as improve performance in learning and teaching. The following is shown in Table 9 regarding the ability scores of prospective physics teacher students in the use of learning resources.

Table 9. Assessment Score on the Aspects of Learning Resources first cycle and second cycle

Aspects	Indicators	Score		
		first cycle	2nd cycle	Average
Learning resources	Selection of learning resources online/offline	4.63	4.85	4.74

Based on the results of peer assessment, various aspects of learning resources were used. In the first cycle, the learning resources used by prospective physics teacher students were mainly in the form of digital teaching materials, such as electronic school books

(BSE), e-modules, and power points that prospective physics teacher students designed. Because learning activities are still carried out online, making it easier for students to access learning resources. In cycle two, after an assessment between friends, the learning resources used by prospective physics teacher students are more numerous and varied, such as using videos uploaded on youtube and other websites on the internet. The average score on the aspects of teaching resources used in learning in the first cycle is 4.63, and in the second cycle is 4.85. Thus, there was an increase from cycle one to cycle two, meaning prospective physics teacher students were good at choosing online learning resources.

Evaluation Aspects

Evaluation is a process of collecting, analyzing, and interpreting information to determine the level of student success from the learning objectives that must be achieved (Anwar, 2021). Based on table 10, the evaluation aspect consists of 4 indicators: the scope of the evaluation aspect, the assessment's suitability with learning objectives/indicators, assessment components, and planning enrichment and remedial activities. The following is the assessment score for the evaluation aspect of each indicator in cycles 1 and 2.

Table 10. Assessment Score on the Evaluation Aspects of the first cycle and second cycle

Aspects	Indicators	Score		
		first cycle	2nd cycle	Average
Evaluation	Scope of evaluation aspects	4.51	4.69	4.74
	Appropriateness of the assessment with the objectives/indicators	4.72	4.88	4.80
	Assessment components	4.41	4.69	4.55
	Planning enrichment and remedial activities	3.98	4.52	4.25
Average		4.41	4.69	4.59

According to the figure, six evaluation aspects in the first cycle obtained an average score of 4.4, while the second cycle obtained an average score of 4.7. These scores show that the second cycle's evaluation aspect of 2nd cycle has increased from the first cycle. Indicator 4, related to planning for the enrichment and remedial activities in the first cycle, is the indicator with the lowest score, followed by indicator 3, related to the assessment component. In comparison, the indicator with the highest gain is indicator 2, related to the suitability of the assessment with the objectives or learning indicators in the second cycle. Likewise, in the evaluation aspect, prospective physics teacher students have good abilities to adjust assessments based on learning objectives or indicators.

Skills in preparing lesson plans

Aspects of Preliminary Activities

The first step in learning activities is the introduction. This creates practical early learning to enable students to follow the learning well. Preliminary activities are the initial series in learning that affect the subsequent learning process. Therefore, preliminary activities must be designed and implemented efficiently, effectively, systematically, and flexibly. Efforts are made to create a good and systematic beginning of learning, including teachers can prepare students in advance both physically and mentally, motivate students, convey apperception, and convey learning objectives and the scope of the material to be

studied (Persada et al., 2020). The following is shown in Figure 1 regarding the ability score of prospective physics teacher students in preliminary learning activities.

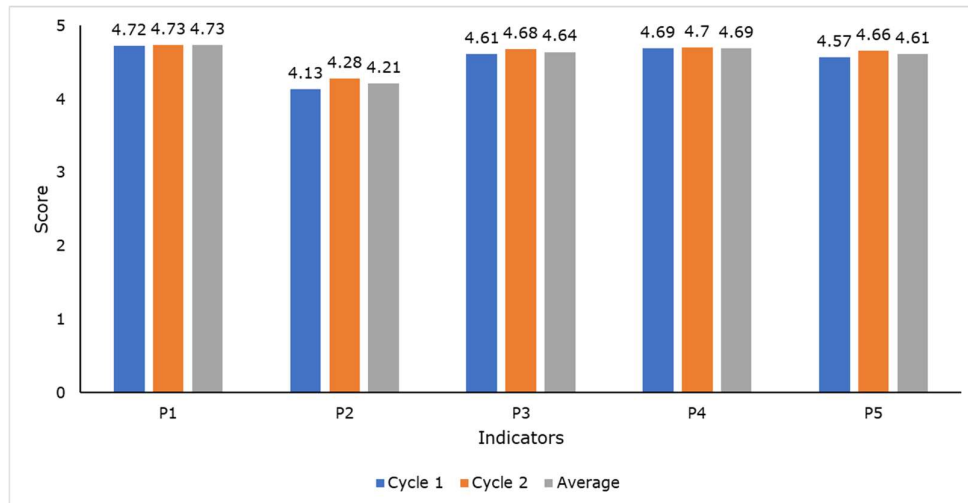


Figure 1. Comparison Graph of Each Indicator on Aspects of Preliminary Activities first cycle and second cycle

Based on the assessment between friends for aspects of preliminary activities, it is known that the average performance score of the first cycle is 4.55, while the second cycle is 4.61. These results indicate an increase in the second cycle after the assessment between friends. In the first cycle, the indicator with the lowest score is indicator two, which is related to motivating students. Meanwhile, in cycle two, the indicator with the lowest score was also in indicator two, but the second cycle performance of 2nd cycle obtained a higher score than the first cycle. The indicator with the highest score in the first cycle was indicator 1, related to skills in preparing students physically and mentally. Then after an assessment between friends, indicator one still gets the highest score. Likewise, in the aspect of skills in the preliminary learning activities, prospective physics teacher students are still lacking in motivating students.

Aspects of Core Activities

Core activities are the main activities of all learning processes. Activities to achieve essential competencies that must be met. In this aspect, the teacher fulfills several indicators to create a systematic, inspiring, creative, and interactive learning process. Such as implementing learning models, learning methods, learning media, learning resources, and other aspects previously designed in the lesson plans (Sobarningsih et al., 2019). In this study, the skills of prospective physics teacher students in carrying out core learning activities were assessed between friends through 2 cycles. The score for assessing core learning activities skills by prospective physics teacher students is shown in Table 12.

Table 11. Assessment Score on Aspects of Core Learning Activities

No	Indicators	Score		Average
		first cycle	2nd cycle	
1	Mastery of delivering material	4.50	4.60	4.55
2	Applying the concept of learning materials to life	4.33	4.32	4.33
3	Methods reflect active/scientific learning	4.44	4.49	4.47
4	Cultivate positive habits	4.27	4.38	4.32
5	Using tools/materials and media	4.6	4.62	4.61
6	Assessment of the learning process	4.27	4.31	4.29
7	Class management	4.34	4.42	4.38
8	Language use	4.78	4.8	4.79
9	Social sensitivity	4.47	4.52	4.49
10	Personality	4.73	4.77	4.75
11	Assessment of learning outcomes online	4.17	4.18	4.17

Based on the assessment between friends for the appearance of aspects of the core learning activities in Table 11, it is known that the first performance obtained an average score of 4.45 while the second performance scored 4.49. These results indicate an increase from the first to the second cycle even though it was only slightly, namely 0.04. As for indicator 11, namely regarding online learning outcomes assessment, which obtained the lowest score in the first cycle, 4.17, while the second was 4.18. Followed by indicators of assessment of the learning process and fostering positive habits, but after an assessment between friends, the two indicators have increased. As for the indicators that get the highest score, indicator 8 is related to language use, with the value of the first cycle being 4.78 and the second cycle being 4.80. Based on this, prospective physics teacher students have not been able to meet the indicators related to online learning outcomes assessment.

Aspects of Closing Activities

The closing activity of learning is the end of the learning process in which the activity of closing the learning is carried out by reviewing or concluding learning materials, reflecting, and follow-up can be in the form of giving assignments, remedial or enrichment (Asmil & Hasrul, 2020). Table 12 shows the assessment of implementation skills to close the learning carried out by prospective physics teacher students through two assessment cycles.

Table 12. Assessment Score on Aspects of Core Learning Activities

No	Indicators	Score		Average
		first cycle	2nd cycle	
1	Summarizing learning materials	4.56	4.60	4.58
2	Reflect and plan follow-up	4.14	4.18	4.16

Based on the assessments made between friends for closing learning skills in Table 12, the average score for the first cycle is 4.35; after the second cycle assessment, the average score is 4.39. These results indicate an increase after the assessment of the second cycle. This aspect of closing the learning consists of two indicators, the first is related to summarizing the learning material, and the second is related to reflection and follow-up plans. The second indicator gets the lowest score in the first cycle, which is 4.14, the second

cycle is 4.18, and the first indicator gets the highest score first cycle, with a score of 4.56, and the second cycle, with a score of 4.60. From these two indicators, there was an increase in the second cycle. Based on this, prospective physics teacher students still lacked in reflecting and planning follow-up actions.

Aspects of Using ICT

Today, information technology influences the world of education, including the learning process. According to Rosenberg, with the development of the use of technology, there are several shifts in education, especially the learning process, namely (a) starting from training shifted to appearance, (b) starting from the classroom to being anywhere and anytime, (c) starting from paper to "online" or digital, (d) starting from physical facilities to network facilities, and (e) starting from cycle time to real-time. So ICT has a vital role in learning, given the potential of technology to facilitate and optimize the student learning process (Muniati, 2020). Even today, both teachers and students are required to master the use of technology in learning. Table 13 shows the ability scores of prospective physics teacher students on the use of technology in the learning process.

Table 13. Assessment Score on Aspects of ICT Use

Indicator	Score		Average
	first cycle	2nd cycle	
Use of Technology in Learning	4.39	4.50	4.44

Aspects of Student Response

In the learning process, there must be an interaction between teachers and students, students and teachers, students and students. Interaction can also be in the form of responses or responses from students to teachers or vice versa so that the situation in learning affects learning outcomes. With student responses, teachers can find out how the description of opinions and attitudes, either positive or negative, towards all indicators in the learning process. The responses these students give can show students' interest in learning, which can affect student learning outcomes (Suren & Ali Kandemir, 2020). The following Table 14 shows the ability scores of prospective physics teacher students to get student responses in their learning activities.

Table 14. Assessment Score on Student Response Aspects of the first cycle and second cycle

Indicator	Score		Average
	Cycle 1	Cycle 2	
The using of technologies in learning	4.39	4.50	4.44

Based on the assessment results between friends on the aspect of the student's response, the average score was 4.21. The assessment between friends in the first cycle obtained a score of 4.19, while the second cycle obtained a score of 4.23. It can be seen that from the first to the second cycle has increased. That is, during the learning process, students respond well to the teacher and vice versa.

CONCLUSION

The assessment resulted in a fundamental skill score for prospective physics teacher students in preparing lesson plans and teaching in the first cycle obtained an average score of 89.5. Then after the assessment between friends, namely in the second cycle, an average score of 92.6 was obtained. Based on this score, it is known that Peer Assessment effectively improves basic skills in preparing lesson plans and their implementation. This is proven by the data obtained. In preparing learning, the aspect should be considered by teacher, or prospective teacher including the characteristic of learning material, student, learning media, activity and evaluation. Hence, it is important for teacher to share their lesson plan each other to make sure the lesson plan was feasible to achieve learning outcome.

CONFLICT OF INTEREST

There is no conflict of interest.

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