



## Differences Between Conventional Learning Methods and Peer-Assisted Learning on The Anatomy Practical Results of Medicine Student UISU

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### ABSTRACT

Anatomy practicals are a vital component of medical education, yet many students still struggle to grasp anatomical concepts. The conventional teaching methods currently in use are often ineffective in improving students' understanding. *Peer-Assisted Learning* (PAL) has been shown to enhance learning outcomes across various disciplines, but has not yet been widely implemented in anatomy practicals. This study aims to determine the difference between conventional methods and PAL on the anatomy practical results of students at the Faculty of Medicine, UISU. The study employed a quasi-experimental design with a pre-test and post-test control group involving 54 students from the 2024 cohort who were randomly selected at the Anatomy Laboratory of the Faculty of Medicine, University of Islam. Hypothesis testing was performed using a *t-test*. The mean *pre-test* and *post-test* scores for the conventional method were 31.20 and 57.80, whilst for the PAL method they were 30.00 and 65.51. There was a significant difference between the *pre-test* and *post-test* scores for both methods ( $p = 0.000 < 0.05$ ). However, there was no significant difference in *pre-test* scores ( $p = 0.833 > 0.05$ ) or *post-test* scores ( $p = 0.213 > 0.05$ ) between the two methods. Both methods improved the mean scores, although PAL showed statistically higher results.

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## INTRODUCTION

The Faculty of Medicine at the Islamic University of North Sumatra employs a *Competency-Based Curriculum* (CBC) approach. This method focuses on Student-Centred Learning which means that learning is centred on the students, rather than Teacher-Centred Learning which is centred on the teacher. Student Centred Learning is an approach that requires students to play an active role, by building understanding through the steps of observing, identifying existing issues, formulating hypotheses regarding the problem, gathering information from various sources, analysing the data obtained, drawing conclusions, and conducting evaluations (Widyanto & Vienlentina, 2022). There are various learning activities undertaken by students in the Medical Education Study Programme at the Faculty of Medicine, UISU, namely *Small Group Discussions* (SGD), Skills Labs, expert lectures, practical sessions, and independent study.

In medical education, various teaching methods are employed. One of the most commonly used methods in anatomy classes is the conventional method. This method tends to focus more on conveying information than on conducting hands-on demonstrations (Puspita et al., 2022). For years, instructors have dominated the learning process by lecturing on the material during class, while students have served as passive listeners. This teaching method is considered ineffective in conveying key concepts within a limited timeframe (Simorangkir, 2015). Success in learning is greatly influenced by the strategies or methods used. Without a good strategy, learning will not be optimal, effective, or efficient (Wulandari & Kunci, 2022).

Challenges in anatomy education often arise due to the complexity of the material, limited study time, and the fact that the ideal student-to-instructor ratio has not yet been fully implemented in laboratory sessions. The ideal student-to-instructor ratio plays a crucial role in creating an effective learning process (Ramadhani et al., 2025). Based on observations at the UISU Faculty of Medicine itself, there are still several challenges faced in the anatomy learning process, including low achievement in student anatomy lab work due to their lack of understanding of anatomy. Additionally, students' weak interest and lack of motivation to study anatomy affect their active participation in the learning process. Compounding this is the fact that the lab course carries only 1 credit hours, leads students to view anatomy labs as unimportant, so they do not prioritize learning anatomy during the lab sessions.

Creative teaching methods continue to be developed, such as *Peer-Assisted Learning* (PAL), which is increasingly being used in medical schools (Puspita et al., 2022). A study conducted by Risqita and her colleagues in 2023 revealed that the implementation of the Peer-Assisted Learning method has a significant effect on students' cognitive abilities and block scores. Additionally, a study conducted by (Siswanti et al., 2020) explains that there is a positive correlation between teaching methods and student motivation. This indicates that learning motivation has a significant impact on improving learning outcomes, particularly through the Peer-Assisted Learning method (Ramadhani et al., 2025).

Based on the above explanation, the researcher is interested in conducting a study on the differences between conventional learning methods and peer-

assisted learning in the anatomy practicals results of students at the Faculty of Medicine, University of Islam Sumatra Utara.

## LITERATURE REVIEW

### A. Learning Methods

Indonesia's education system still requires more comprehensive development. College graduates are often unprepared to teach because, although they understand the theory, they are unable to apply it in the learning process. Some of the issues that arise include a lack of creativity and innovation among teachers in creating learning aids, as well as a lack of evaluation and improvement of these learning aids by educators. Consequently, this creates learning challenges for students, including a lack of motivation. Without innovation in teaching methods, the material presented by teachers will not be well-received by students. Therefore, it is crucial for teachers to develop innovative teaching methods. Learning must enhance students' critical thinking, communication, collaboration, and creativity skills to align with the competencies required for 21st-century learning (Nirmayani & Dewi, 2021).

### B. Learning Approach

A learning approach can be defined as a guideline or framework for instructors in the teaching process, with the aim of maximizing the desired learning outcomes. The learning process can be categorized into two types: a teacher-centered approach, known as *Teacher-Centered Learning* (TCL), and a student-centered approach, known as *Student-Centered Learning* (SCL) (Satriaman et al., 2018).

#### 1. Teacher Centered Learning

This conventional model is also known as *Teacher-Centered Learning* (TCL). In this approach, the teacher acts as an expert who imparts knowledge to students. The TCL approach emphasizes student achievement within a relatively short period of time. In the TCL learning model, student motivation is based on a system of rewards and punishments administered by the teacher (Hutasoit, 2021). Teacher-centered learning methods also involve lectures. When attending a lecture or listening to lecture material, students simply absorb information while taking notes. The instructor plays a central role in achieving learning objectives and appears to be the sole source of knowledge. Conventional teaching methods, namely *teacher-centered learning* (TCL), are still frequently chosen by instructors as the most efficient way to teach in the classroom (Altino & Hermawan, 2020).

#### 2. Student Centered Learning

*Student-Centered Learning* (SCL) is a learning approach that prioritizes students as active and independent individuals in the learning process, taking into account their psychological state as adults, who are fully committed to their own learning, and are capable of learning outside the classroom environment. Student-focused learning methods can encourage them to be more actively and independently involved, according to their

individual learning pace. This learning process must also be adapted to the students' developmental stage and guided to maintain a dynamic nature and achieve a high level of competence (Muliarta, 2018). The goal of the *Student-Centered Learning* (SCL) model is to improve the quality of the learning process carried out by teachers, maximize students' potential in learning activities, and it is hoped that this method can increase and encourage students' curiosity about the material being studied (Febriyana & Winarti, 2021).

#### C. Learning strategies

A learning strategy is an approach to teaching and learning activities used to achieve goals efficiently. To effectively carry out teaching duties, every teacher needs to have a deep understanding of various teaching strategies that align with the predetermined learning objectives. The teaching method chosen by the teacher must be tailored to the abilities and goals of the students, and should make them feel comfortable, thus increasing their engagement (Nasron et al., 2024). Strategically organized learning is more organized. It's more likely to involve classroom facilities, resources, and resources provided by the campus to achieve learning objectives. Furthermore, with a learning strategy, resources are optimally utilized. If teachers or lecturers implement learning strategies effectively, learning will be more active. Furthermore, with a learning strategy, teachers or lecturers are also more strategic in making decisions, utilizing all components related to learning to achieve effective and efficient learning (Sanjani, 2021).

#### D. Conventional Method

Conventional learning is a teaching and learning process that tends to be monotonous and verbal. The delivery of material to students still relies too heavily on lectures, thus being perceived as a teacher-centered learning process. The teaching and learning process in conventional learning is typically one-way, where knowledge, information, norms, and values are transferred from teacher to student. In this approach, students are considered "empty bottles" or "white paper" that teachers must fill with various knowledge. This learning model is known as the banking concept (Fahrudin et al., 2021). Conventional methods often make the teacher or lecturer the center of attention, such as when conducting a lecture using a PowerPoint presentation. This can result in students becoming less involved and more focused on their own activities (Gunawan et al., 2019).

#### E. Peer Assisted Learning Method

*Peer-Assisted Learning* (PAL) is a student-centered learning method or strategy. This method is considered a collaborative and cooperative approach and provides various academic benefits for students (Andriani et al., 2017). Learning involving peers implements active learning strategies, which are considered more effective in improving students' cognitive understanding. The *Peer-Assisted Learning* (PAL) method can be an effective alternative in improving the cognitive abilities and learning motivation of medical students (Ramadhani et al., 2025).

Learning assistance is provided by higher-achieving students, called tutors, to other students in need of support, known as tutees. *Peer-Assisted Learning* (PAL) is considered important because it benefits both parties: the tutee, who receives guidance, and the tutor, who deepens their understanding through the teaching process (Diana, 2016).

This method involves students acting as peer tutors, who have received training, to support and assist their peers in the learning process. Peer tutors are students who meet the criteria and have received permission from their lecturers to become tutors, enabling them to provide effective guidance. The use of peer tutors in the learning process is quite common because it is considered more efficient, as students can share information and learn how to communicate with each other (Zulvia et al., 2020).

#### F. Anatomy Practical

Practical activities are an important part of the learning process, serving three main purposes: improving cognitive, affective, and psychomotor skills. In this context, anatomy studies the normal structure of the body, encompassing aspects such as shape, size, location, supporting factors, and relationships with other structures. Furthermore, anatomy is the foundation for understanding body physiology and structural changes associated with pathology or disease. Without understanding body structure, it is difficult to understand the physiological processes that occur in a healthy human body. The pathophysiology of disease is rooted in changes that occur both physiologically and anatomically. Therefore, a thorough mastery of anatomy is essential for students to be able to perform physical examinations, which are crucial in diagnosing disease (Maula et al., 2024).

Anatomy, a crucial component for understanding various aspects of the human body, serves as the foundation of medical education. The effectiveness of teaching methods significantly impacts how students grasp anatomical concepts and their application in clinical settings. Therefore, it is crucial to continually evaluate and refine teaching methods to achieve optimal learning outcomes. Anatomy deepens our understanding of the structure and function of the human body. Equally important, medical students and physicians need to hone their clinical skills through practical work. In a study conducted at a medical school in Jeddah, students emphasized the importance of active learning and engagement in enhancing their knowledge and understanding. Similarly, previous research indicates that active learning methods are considered effective in anatomy instruction, as they enable students to tap into their own creativity and intelligence (Alghamdi et al., 2024).

## METHODOLOGY

This study employed a quasi-experimental design with a pre-test and post-test control group design. The study population consisted of all students in the Faculty of Medicine at the *University of Islam Sumatera Utara* (UISU) in the class of 2024, with a sample size of 54 students selected using random sampling. The study was conducted at the Anatomy Laboratory of the UISU Faculty of Medicine after obtaining approval. Data collection was carried out by

administering a pre-test before the intervention and a post-test after the implementation of the Conventional and *Peer Assisted Learning* (PAL) methods. The data obtained were then processed through editing, coding, and tabulation, and analyzed using a T-test to determine differences in learning outcomes before and after the intervention and to compare the two learning methods. This study has received ethical approval from the UISU Ethics Committee (KEPK) under No. 74/EC/KEPK.UISU/IX/2025.

## RESULTS AND DISCUSSION

Table 1. Respondent Characteristics Based on Gender and Learning Method

<b>Gender</b>	<b>n</b>	<b>%</b>
<b>Characteristics</b>		
Man	13	24,1
Woman	41	75,9
<b>Total</b>	54	100
<b>Learning Methods</b>		
Conventional	25	46,3
Peer Assisted Learning	29	53,7
<b>Total</b>	54	100

A total of 54 students participated in this study. The majority of respondents were female (75.9%). Based on teaching methods, 46.3% of students were enrolled in conventional classes, while 53.7% were enrolled in peer-assisted learning classes.

Table 2. Pre-test and Post-test Results of Conventional Method

<b>Variable</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
<i>Pre-test</i>	0	70	31,20	22,420
<i>Post-test</i>	10	100	57,80	25,045

In the conventional group, there was an increase in the average score from 31.20 (*pre-test*) to 57.80 (*post-test*), indicating an improvement in learning outcomes following the intervention.

Table 3. Pre-test and Post-test Results of the Peer Assisted Learning Method

<b>Variable</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
<i>Pre-test</i>	10	70	30,00	19,318
<i>Post-test</i>	40	100	65,51	19,925

In the PAL group, the average score increased from 30.00 (*pre-test*) to 65.51 (*post-test*), indicating an improvement in learning outcomes following the implementation of the PAL method.

Table 4. Results of Paired T-Test Pre-test and Post-test for Both Methods

<b>Method</b>	<b>Mean Pre-test</b>	<b>Mean Post-test</b>	<b>p-value</b>
Conventional	31,20	57,80	0,000
Peer Assisted Learning	30,00	65,51	0,000

The results of the paired t-test indicate that there is a significant difference between the *pre-test* and *post-test* scores for both methods ( $p < 0.05$ ), which means that both methods significantly improve learning outcomes.

Table 5. Results of the Independent T-Test Between Methods

Variable	Mean Konvensional	Mean PAL	p-value
Pre-test	31,20	30,00	0,833
Post-test	57,80	65,51	0,213

There were no significant differences between the Conventional and PAL groups in either the *pre-test* or *post-test* scores ( $p > 0.05$ ), although the mean *post-test* score for the PAL group was higher than that of the Conventional group. This study found no difference in academic performance in the anatomy laboratory course following the implementation of the Conventional and Peer Assisted Learning methods among students at the UISU Faculty of Medicine. This study involved 54 students from the total third-semester cohort of 2024 who served as tutees and five seventh-semester students from the 2022 cohort as peers or teaching assistants. The majority of students were female, totaling 41, while males numbered 13. However, this study showed that both methods resulted in an increase in understanding from before the implementation of the learning methods to after their implementation, as evidenced by the learning outcomes. The improvement in both learning methods can be seen through the average scores after the learning process. The average score after learning using the Conventional method in the control group was 57.80, while the average score for the Peer Assisted Learning in the intervention group was 65.52. This study concluded that the average score for the PAL method in this study was higher than that of the Conventional method. Although the PAL group had a higher average post-test score compared to the Conventional group, further statistical tests are needed to determine the significance of this difference.

Based on the results of the independent *t-test*, it was found that there was no difference between the conventional learning method and Peer Assisted Learning in the anatomy lab results of UISU Faculty of Medicine students. The above findings can be concluded to mean that both the conventional method and PAL yield equivalent results in achieving anatomy lab grades. The absence of a significant difference between the two learning methods may be attributed to several factors. Standardization of materials ensured that both learning method groups received the same anatomical content, resulting in relatively similar knowledge outcomes. Additionally, the implementation time for the PAL intervention group was relatively short; therefore, differences in effectiveness compared to the conventional method may not yet be extremely evident in quantitative test results.

Practical learning using the PAL method led by peer tutors has a positive impact on improving student learning outcomes. This improvement is evident in the higher post-test scores. Social interaction in the PAL method plays a crucial role in cognitive development. This theory explains that knowledge is constructed through interaction with others, and learning that occurs in a social context tends to be more profound. Collaboration within groups can foster more complex and

creative thinking processes, thereby enhancing cognitive abilities (Damaralam et al., 2023). Learning success with the PAL method is influenced by several factors, including the fact that students have already studied the course material. This process helps them gain a deeper understanding of concepts and improves their memory. The PAL method can also improve test scores and academic performance because it boosts students' confidence and allows them to demonstrate their abilities during laboratory sessions, thereby enhancing their cognitive and social skills (Wendra, 2021). In addition, peer-tutored learning can also enhance active participation, self-confidence, and engagement in the learning process. The Peer-Assisted Learning method encourages students to actively engage in the learning process, enabling them to take a more active role in their own learning (Chang-Tik, 2022). In the results of this study, although peer-tutored learning was found to yield higher average learning outcomes, it should be noted that the PAL method cannot fully replace instruction by a faculty member. Learning involving higher-order cognitive skills, such as analyzing, evaluating, and creating new ideas, requires the instructor to play a crucial role in the teaching process. This aligns with the research by King and Kitchener (2014), which indicates that higher-order cognitive skills such as critical thinking require active guidance from the instructor (Ramadhani et al., 2025).

Learning outcomes using the conventional method in this study also showed an increase in average scores. Active learning guided by instructors was also able to enhance students' understanding. The interactions that occurred during the learning process improved students' critical thinking skills in understanding the course material. Furthermore, instructors do not merely provide explanations of the material but also serve as facilitators who help students guide discussions and resolve any confusion that may arise in understanding the material (Degeng et al., 2017). The improvement in learning outcomes is due to a learning process that takes place in a systematic and structured manner, in which educators play an active role in delivering the learning material. The Conventional Method allows students to receive direct explanations, with an emphasis on key concepts that support understanding of the material. Although the Conventional Method tends to be one-way and teacher-centered, it remains effective in improving learning outcomes, particularly for students who require clear guidance (Wulandari & Kunci, 2022). A limitation of this study is the difficulty in fully controlling for confounding factors that are suspected to influence the results. These confounding factors include, among others, the fact that the researcher did not group students into the PAL method based on cognitive ability, the pre-test and post-test questions were not reviewed or revised, the ability of peers (teaching assistants) to facilitate learning was not evaluated, and the researcher did not assess whether the PAL method learning process was truly PAL or not. Further research is needed to investigate learning methods and the factors that influence students' cognitive abilities and learning motivation.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, it can be concluded that there is no difference between the conventional learning method and the Peer Assisted Learning method in the anatomy lab results of UISU Faculty of Medicine students. However, there was a significant difference between pre-test and post-test scores in the control group, which was taught using the conventional learning method, as well as in the intervention group, which was taught using the Peer Assisted Learning method. This indicates that both learning methods equally improved learning outcomes in the anatomy laboratory, although there was no significant difference between the two.

## FURTHER STUDY

This research typically only measures laboratory outcomes immediately after the session ends. Further research could examine whether the Peer-Assisted Learning (PAL) method affects long-term retention compared to conventional methods. Conduct a follow-up test (a second post-training test) 3 to 6 months after the practicum ends to determine whether social interaction in PAL is more effective in consolidating memory compared to one-way explanations from the instructor.

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