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# Physical education students' reflections about the learning outcomes of different teaching methods: a mixed methods study

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**Introduction:** Teaching in higher education is still mainly executed as lectures, even though research about student-active instruction methods points to more motivated students, higher enjoyment, and more optimal learning outcomes. The purpose of this study was to obtain better insight into how physical education (PE) students assessed their learning outcomes in relation to the use of different pedagogical approaches.

**Methods:** A master's course in PE was planned and implemented using the following eight different learning approaches: lectures; practical exercises about themes in lectures; discussions during lectures; discussions outside of lectures; planning and exercises for peer students; individual work preparing to write an academic text; individual work writing the academic text; and reading for an exam. The study constituted a mixed methods study, which used quantitative data from students' evaluation of eight different learning approaches on a Likert-type scale, and in-depth qualitative data from follow-up interviews with some of the same students, with the aim of explaining the main findings. Quantitative data about the students' reflections on the learning outcomes of the different learning approaches were collected among 59 different students at three different times (2021, 2022, and 2023), after finishing a course in the fifth semester in a master's program in PE.

**Results:** The findings showed that the students reported achieving the highest learning outcomes from practical exercises and attaining the lowest learning outcomes from lectures. In depth interviews among seven randomly selected students were also used to obtain reflections from the students about the different learning approaches. Quantitative analyses again revealed that practical exercises produced the highest learning outcomes, while lectures resulted in the lowest learning outcomes. Qualitative analyses of the in-depth interviews indicated that practical activities enabled students to relate theory to practice, make them active, and are associated with future work, while the quality of lectures depended on characteristics of the teacher and were often experienced as long and unstimulating.

**Discussion:** According to the results, we recommend that student teachers in higher education acquire the ability to plan and execute practical lessons in relation to themes focused upon in lectures and involve students more in discussions during lectures.

## KEYWORDS

student teachers, learning outcomes, lectures, practical activities, pedagogical methods

## Introduction

According to the Norwegian government's report on recommended strategies to ensure excellent quality in higher education (Meld. St. 16, 2016–2017), teachers in higher education should evaluate the efficacy of their educational work. Because high research quality seems to be relatively more rewarded than teaching in higher education, and most of the lecturers in Norway are more focused on research than teaching, Vabø and Ramberg (2009) find that such evaluation studies may be lacking.

In Norway, teachers at universities and university colleges are often simultaneously performing teaching and conducting research. Although they are supposed to practice “research-based teaching,” precisely what this expression means and how best to implement it remain unclear (Børte et al., 2020).

## Previous research

Traditionally, teaching in universities is executed as lectures that are delivered by highly qualified professors. Indeed, this is still the most common method in higher education, despite the fact that it has been widely criticized for causing students to be passive listeners and diminishing learning outcomes (Young et al., 2009; Wieman, 2019). Ideally, education provided to students should both constitute a presentation of updated research on the actual subject in the curriculum, as well as use the learning approaches that create the highest learning outcomes and are most efficient (Griffiths, 2005). For example, if teachers in higher education plan and execute their lessons with small “breaks” in the lecture and use different methods for involving the students, such as problem sets, brainstorming or open discussions, research has demonstrated improved exam performance, and students reported better perceived effectiveness and decreased distractions (Miller et al., 2013). Moreover, the students stated that during long and unstimulating lectures, they are more likely to send e-mails, send text-messages, or engage in other activities on their electronic devices than during engaging lectures (Miller et al., 2013). For students who are familiar with lectures that are devoid of interaction with the lecturer or who believe that breaks during in the lecture produce low learning, these activities feel markedly unproductive (Knight and Wood, 2005).

Brown and Bakhtar (1988) report that the lecturer saying too much, speaking too quickly, and not including sufficient summaries constitute a major challenge for students. They suggest that the effects of lectures can be substantially improved by focusing on presenting the lecture in more succinct manner and keeping the focus on the major points of the lecture. Extant literature has identified several barriers that prevent lectures from including active learning methods in educational plans, including a lack of requisite class time and insufficient time to prepare active learning methods. Furthermore, it is argued that teachers' familiarization with holding traditional lectures makes continuation of such lectures comfortable for them and enjoyable (Brown and Bakhtar, 1988; McCabe and O'Connor, 2014; Miller and Metz, 2014; Trinidad, 2019). Students believe that the reason for the lecturers decision not to incorporate active learning methods in their lessons could be either that they want to control the education through the use of lectures or they do not possess the needed knowledge to implement active learning methods (Miller and

Metz, 2014). Furthermore, when curricula are relatively large and information-dense, lecturers regard lectures that do not include any interference from the students to be the only viable option (Lujan and DiCarlo, 2006).

Regmi (2012) contends that the debate should not concern being for or against using lectures as a method for learning, but rather how to organize teaching with several methods to enhance learning outcomes. In fact, this argument is almost identical to that of Penson (2012), who acknowledges the advantages of continuing to have lectures in education at universities, as well as combining them with relevant practical activities to produce optimal education. Medical students stated that lectures were important, as they assisted them to obtain key knowledge in a subject, and that learning was effective when combined with other learning methods. It was also reported that learning in the lectures depended on the characteristics and skills of the lecturer (Bates et al., 2018). A study among nursing students identified the following five essential factors that improved learning in lectures: (1) effective and clear speaking; (2) an emphasis on exam topics; (3) taking students' interests into account; (4) connecting theory to practice; and (5) providing a well-structured presentation (Al-Modhefer and Roe, 2009). A prerequisite for lectures to be educational is for the lecturer to be actively engaged (French and Kennedy, 2017). Ideally, the lecturer should present the latest updated theories and be able to discuss different perspectives about the theories. If a lecturer succeeds in this, it will positively affect students' motivation and challenge them academically (French and Kennedy, 2017).

It is well documented that by activating students, learning outcomes and motivation increase (Freeman et al., 2014; Damsa et al., 2015; Goodman et al., 2018). According to Bernstein (2018), active learning methods include posing questions for in-class or online discussions, using problem-based/case-based teaching, including peer reviews of writing, giving homework assignments, performing laboratory experiments, and “underteaching,” amongst others (Bernstein, 2018). The main purpose of active learning methods is to put the students in situations in which they engage in activities that are relevant to the subject, and ensure that the situation/task leads to reflection, communication, and analysis (Dewey, 2008; Smith and Cardaciotto, 2011). Furthermore, it is recommended that the teacher facilitate and create environments in education in which students' learning occurs in the specific activity (Goodman et al., 2018). In fact, students appreciate active learning methods and highlight several positive effects that are derived from it, including markedly increased autonomy and engagement (McCabe and O'Connor, 2014; Sørensen et al., 2023). Active learning methods also increase involvement and motivation for the subject (Lea et al., 2003), improve in-depth learning, and create a greater acceptance of failure in the subject (Lea et al., 2003; McCabe and O'Connor, 2014). Previous literature has also reported improved performance in exams and a decrease in failure in exams because of the use of active learning methods instead of lectures (Freeman et al., 2014; Goodman et al., 2018).

## Theoretical framework

From a theoretical perspective, Dewey (1916) describes the need for societies to pass on the skills and knowledge that they accrue through a formal system of education. However, transferring learning

through a formal context is problematic, according to Dewey. Dewey offers a general critique of the general trend of academization, and censures teaching for not sufficiently considering pragmatic aspects of life. For Dewey (1916, p. 307), vocation is “a continuous activity having a purpose.” In other words, when teachers relate theory to practice, a meaningful purpose is obtained. Indeed, Dewey states that we learn through vocations, rather than for them—a theory closely related to Aristotle’s concept of “*phronesis*,” or practical wisdom. Drawing upon Dewey, Kolb (1984) defines experiential learning as a process that links education, work, and personal development. It is again asserted that theory must focus on practice. Without an interested student, without a clear starting point in the student’s former experience/expectations, obtaining a good learning result is highly challenging. Furthermore, Dewey (1916) points out that an interaction must occur between the student and what is learned, i.e., the student must learn theory that he or she finds both useful and interesting. However, students report that the theory “easily becomes remote and dead—abstract and bookish” Dewey (1916, p. 8). Dewey contends that with a clear starting point in pragmatic examples, achieving excellent learning outcomes will be much easier.

It is asserted that schools should change their educational practice from lecture-focused to providing students with experiences that apply to real-life situations (Dewey, 2008). Consequently, students could improve their learning outcomes through the process of reflecting upon their experiences. Furthermore, by giving more responsibility to the students for the learning process itself, they will be more capable of constructing their own learning (Trinidad, 2019). Researchers have demonstrated that Dewey’s progressive pedagogy and philosophy still play a role in schools’ daily practice (Berg, 2013; Little, 2013; Lagestad, 2014; Sadovnik et al., 2017).

## Research questions

Considering the previous discussion about learning from different pedagogical approaches, this study will examine the following two research questions: (1) Are there differences between students’ reflections about their learning outcomes using different pedagogical approaches? and (2) What are the students’ reflections about the pedagogical approach that creates the best and the worst learning outcomes?

## Methods

### Design

This study uses a mixed-methods design that comprises both questionnaire data to examine students’ reflections on their learning outcomes in relation to the use of eight different pedagogical approaches, and in-depth interviews to obtain more nuanced knowledge about their reflections about this research area. Quantitative analyses assess differences between students’ reflections of their learning outcomes in eight pedagogical approaches, while the interviews investigate why students prefer certain pedagogical approaches over others.

The research was carried out in a master’s program in physical education (PE) in the fifth semester. In terms of the curriculum, the two main learning outcomes of this subject were: (1) to determine

how sport teachers at college should facilitate their education to develop skills and performance in sport at college; and (2) to identify how sport teachers at college should use research-based education to increase their students’ skills and performance. Education in the actual subject was similar in the three following years, with the same teacher and the same procedures. This research was executed in this actual 15-credit course, but no other courses of the master’s degree had been changed. This research was executed at a small university with relatively small groups of around 20 students in each year, and with only one class of PE each year. The course was organized according to the curriculum, and teaching in the subject was planned and carried out using varied teaching methods, including lectures, and practical exercises/activities that dealt with the topics in lectures and discussions in the class. In addition, the students had long-term work in which they attempted to participate in a research-based exercise program for six weeks. This work was largely autonomous, in which the students could choose training methods and sport based on extant scientific knowledge in the actual sport. This academic task included execution of pre- and post-tests, and exercises concerning relevant research.

The students were also given responsibility in groups to complete certain practical lessons. In addition, one question was added to the questionnaire which did not directly concern teaching, but rather dealt with academic discussions with fellow students or others. The intention here was to determine whether this was regarded as an area that could provide positive learning effects for the students.

## Participants

The quantitative part of the study (questionnaire) included students from three different classes in a master’s program in PE in three consecutive years (2021, 2022, and 2023). At the time of the data collection, the students were in the middle of their five-year program. The participants received a verbal orientation that explained the purpose of the study. They were also informed that participation in the study was voluntary, and that they could withdraw from the study at any time without consequence. All the students that participated provided written consent in accordance with regulations of the Norwegian Center for Research Data (ref. code no 383620).

Of the 17 students of the class of 2021, five females and nine males filled out the questionnaire in November 2021 (77.8% response rate). Of the 23 students of the class of 2022, eight females and 15 males (100% of the class) filled out the questionnaire in November 2022. Of the 22 students of the class of 2023, all students (seven females and 15 males) filled out the questionnaire in November 2023. In total, 59 of the 62 students (20 females and 39 males) filled out the questionnaire, which yielded a response rate of 93.6%. The qualitative part of the study (interviews) included seven randomly selected students from the 2023 group. The reason for low participation in 2021, where that some of the students did not meet at the university the day of data collection.

## Procedures

The selection of the eight different learning methods were based on constructivist pedagogy and the researchers experiences with the

efficacy of these methods. Quantitative data about the students' reflections on the learning outcomes of eight different methods were collected at three different times (2021, 2022, and 2023) after completing a course in their fifth semester in a master's program in PE. The purpose of the questionnaire was to attain knowledge of the students' experience of their learning in eight different pedagogical approaches used in the course, which were: (1) lectures; (2) practical exercises about themes in lectures; (3) discussions during lectures; (4) discussions outside of lectures; (5) planning and exercises for peer students; (6) individual work preparing to write an academic text; (7) individual work writing the academic text; and (8) reading for an exam. According to the specific research question, the questionnaire was self-developed and not based upon a pre-validated instrument. However, the questions and the answers options also have a high face validity (Holden, 2010), and should not lead to different interpretations of the questions. Furthermore, we will argue that both the questions and the answer options led to high reliability.

The questionnaire was designed with a scale between one and six, where six was the highest score:

1. I achieved no learning outcomes from this method.
2. I achieved little learning outcomes from this method.
3. I achieved some learning outcomes from this method.
4. I achieved good learning outcomes from this method.
5. I achieved very good learning outcomes from this method.
6. I achieved excellent learning outcomes from this method.

The survey was carried out in the classroom at the same time of year (November) in all three times (2021, 2002, and 2023), and the questionnaire was administered in paper format. A researcher was present during all the data collection and was available to assist with any questions or difficulties that the students may have had filling out the questionnaire; however, no student had any such questions or difficulties. When the students replied to the survey, they had used these methods for the entire semester (August–November). However, they had experienced some of these methods during their 2.5 years of master study.

An interview guide was created with the aim to examine the reasons for the high scores on practical exercises and low scores on lectures. The main purpose of the questions was to gain access to the students' reflections on their experiences of eight different pedagogical methods used during the course, as well as what they considered to constitute the advantages and disadvantages of these learning outcomes. Open-ended questions that were included were: "Can you explain an episode in your own schooling where you felt you learned a lot?," "Can you describe the way you learned and why you remember this episode well?," "Can you describe how you feel you learn during practical activities?," and "Can you describe how you feel you learn in lectures?" At the end of the interview guide, the following two questions were included about the quantitative findings: "The findings showed that the students identified lectures as the method that created the least learning. Were you surprised by this result, and what are your reflections about it?," and "The findings showed that the students identified practical activities as the method that created the most learning. Were you surprised by this result, and what are your reflections about it?"

After completing the interview guide, a pilot interview was carried out with a randomly selected student in the same study as the

participants in the present study, with the intention to test the effectiveness of the questions in the interview guide. The interview guide obtained many reflections from the student regarding her learning in practical activities and in lectures, and thus was not changed. The interviews of the seven randomly selected students took place during a two-week period in November and December 2023. A voice recorder (Olympus DS-50) was used during the interviews. All interviews were conducted by the same researcher, at the researcher's offices. The individual interviews lasted between 45 and 60 min.

## Data analysis

The student's responses on the questionnaires were analyzed in SPSS, Version 29 (IBM, Armonk, NY, United States). There was a non-normal distribution of the variables (seven out of eight variables achieved significance on a Kolmogorov–Smirnov test). Moreover, since the scale used to measure the dependent variables did not meet the assumptions of parametric tests, nonparametric tests were performed. Mann–Whitney U-tests were conducted to test for differences between year of participation. No differences were found for the eight pedagogical methods regarding year of participation ( $p > 0.05$ ). A Friedman nonparametric test was performed to examine differences in learning outcomes within the eight pedagogical approaches, followed by Wilcoxon nonparametric tests (pairwise comparison).

The interview data were transcribed and entered in the qualitative analysis program NVivo 12 Plus. The interviews were transcribed verbatim, and coded so that the participants were anonymized and given pseudonyms. The analyses were based on transcribed answers focusing on meanings, as described by Johannessen et al. (2016). Opinions and statements were assessed for themes, and then condensed, coded, and categorized in units of analysis (Brinkmann and Kvale, 2009). In this process, the participants' statements were assigned codes that were classified into categories (Hastie and Glotova, 2012). The data were sorted based on these categories to elucidate patterns, similarities, relationships, and/or differences between the statements. The analysis and the interpretation followed hermeneutical principles, in that the interpretation process led to an increasingly deeper understanding of the statements, in parts and in aggregate, in the interviews (Kvale, 1983). The transcribed text was read several times.

Reading the text led to the creation of 12 categories from the students' statements. However, five of these categories were related to the pedagogical methods "lectures" and "practical exercises about themes in lectures," and only these were selected into this study. As shown in the Results section, the main findings of the quantitative analyses were that the pedagogical approach "practical exercises about themes presented in lectures" had the highest learning outcomes score and significantly higher scores than six of the seven other pedagogical approaches. Furthermore, "lectures" had the lowest learning outcomes score, and it was significantly lower than two of the other pedagogical approaches. Therefore, the interview data included in this study included only the three categories about practical exercises and the two categories about lectures, with the aim to obtain more nuanced knowledge regarding the students' reflections about these two pedagogical approaches. The three categories about "practical exercises about themes presented in lectures" were: (1) practical

activities—to relate theory to practice; (2) practical activities about future work; and (3) practical activities—the importance of being active. The two categories about “lectures” were: (1) learning in lectures depends on the teacher; and (2) the lectures are often long and unstimulating.

## Results

### Quantitative results

Friedman analyses showed that there was a significant difference between the eight pedagogical approaches ( $\chi^2_{59} = 49.3, p < 0.001$ ), in which practical exercises exhibited the highest learning outcome, while lectures showed the lowest learning outcome. Follow-up analyses using the Wilcoxon test with Bonferroni corrections revealed that practical exercises produced significantly higher learning outcomes than lectures ( $Z = -5.2, p < 0.001$ ), discussions during lectures ( $Z = -3.7, p < 0.001$ ), discussions outside of lectures ( $Z = -3.4, p < 0.001$ ), planning and exercises for peer students ( $Z = -4.4, p < 0.001$ ), individual work writing an academic text ( $Z = -3.3, p < 0.001$ ), and reading for an exam ( $Z = -3.7, p < 0.001$ ). Furthermore, lectures were reported to yield significantly lower learning outcomes than practical exercises and preparing to write an academic text ( $Z = -5.2, p < 0.001$  and  $Z = 3.8, p < 0.001$ , respectively).

### Qualitative results

The qualitative analyses of lectures and practical exercises pointed towards the following five categories: (1) learning in lectures depends on the teacher; (2) lectures are often long and unstimulating; (3) practical activities—to relate theory to practice; (4) practical activities about future work; and (5) practical activities—the importance of being active.

### Learning in lectures depends on the teacher

The statistical analyses of the quantitative data showed a significantly lower experienced learning outcome of lectures compared to the pedagogical learning methods of practical exercises and preparing to write an academic text. The first main finding from the analyses of the interview data was that learning in lectures depended on the characteristics and skills of the teacher. Indeed, Susan reported that “the teachers are so different,” and Deborah stated that it was “a great advantage if it’s a person who knows a lot and is good at lecturing, and who is interactive with us listeners.” The students agreed that some lectures were more interesting to listen to than others, and that this was due to the quality of teaching from the individual teacher. When Sebastian was asked how he felt about sitting and listening to a lecture, he stated: “I feel it’s easy to drift off when it’s just a lecture, but it depends a bit on the teacher we have.” Oliver echoed Sebastian’s response to the same question:

I feel it’s easy to drift off when it’s just a lecture, but it depends a bit on the teacher we have. How the teacher engages the students, and

how they manage to make what they are talking about interesting. I feel that sometimes it’s just a lot of lecturing, and then it’s easy to zone out.

The students also reported that lectures could be an arena for effective learning under given conditions. Learning during lectures occurred when the teachers presented new theories and described issues in a concise and understandable way. Furthermore, the importance of including students in discussions in the lectures was a crucial element, which not only assisted the students to be able to remain focused, but also increased their motivation and enjoyment at school. Monica describes this as follows:

If the lecture is a one-way communication, then it works poorly, I think. When the lecturer involves the students with questions, or lets us discuss issues with our peer students, it enhances our concentration and motivation.

This experience was supported by George, who emphasized that discussions during lectures increased learning:

When there are discussions in the lectures, I feel it is easier to understand the themes. Often, students in the class have questions for the lecturer that are interesting and make me think differently than I had without those questions. When we have discussions, I believe that I remember better than if it had been a one-way communication.

In addition, Kevin highlights the importance of having discussions during lectures to create more learning:

I think discussions in lectures have the potential to create very good learning. It could give us an opportunity to evaluate if the aspects the lecturer talks about are facts or part of the lecturer’s opinions. I think it is very favorable when it is possible to exchange knowledge and experiences which leads to better understanding.

The analyses of the students’ reflections about why there is low motivation in lectures among some students revealed that the lecturer must take more responsibility for motivating the students through creating more interesting lessons. All the students described student involvement in the lectures as positive for learning outcomes and stated that such involvement was critical to increase the student’s motivation in lectures. In addition, some of the students responded that it was essential for the lecture to be at an appropriate academic level and concern practice to enhance their learning and remain focused. This took place when the students felt that they could relate the presented theory in lectures to something that they already knew, and that they could understand the relevance of the themes to their future employment as teachers.

### Lectures are often long and unstimulating

The second main finding from the analyses of the interview data was that the students often considered lectures to be long and unstimulating. This is exemplified by a statement by Susan, who describes her experience of lectures as follows:

Some of the lectures are very long, slow, and monotonous. Where a PowerPoint presentation with white backgrounds with a lot of text was used, and some of the lecturers just read what is written on the PowerPoint. These factors make it difficult to maintain concentration.

Indeed, the ability to stay focused during long and unstimulating lectures was identified as a substantial challenge among all the students. This challenge was especially present if the lecture was at a high scientific level, which made it difficult to understand, or when the students felt that the lecture had little relevance to their future employment as a teacher. In long and unstimulating lectures with little student involvement, Deborah identified some elements that could lead to low concentration:

In lectures, we have our computers right in front of us, and one touch could take us everywhere. If teachers had been behind us in the classroom, they would have been surprised about what was happening on the students' computers during the lectures. Furthermore, sometimes peer students talk, and I do not hear what the teacher is saying.

The students also stated that lectures should be just one of several pedagogical methods used, and when it was combined with other pedagogical methods, learning outcomes became markedly better. Oliver explains this:

In my opinion, it is okay to have some lectures if they are combined with some practical activities at least once a week. If there are three weeks with only lectures and one practical activity, and then three weeks with lectures, I do not think we remember so much of the themes.

Students' explanations of their relatively low learning outcomes in lectures concerned more than only long and unstimulating lectures. Some of the students highlighted that they were more interested in being active than sitting still in an auditorium; after sitting in a classroom and listening to their teachers for 13 years of education prior to starting university, they were highly frustrated with this activity. Other students indicated low motivation and effort for studying as possible reasons for low learning outcomes in lectures. Confronting the low learning score in lectures, Sebastian pointed to a traditional gender-related view:

Since there are more male than female PE students in our course, and males are more interested in being active than females, this could be an explanation of the low score for learning outcomes in lectures.

## Practical activities – to relate theory to practice

The statistical analyses of the quantitative data revealed that the students perceived significantly higher learning outcomes from practical activities related to themes in the lectures compared to most other pedagogical methods, except for preparing to write an academic

text. The third main finding was that students felt that it was important to be able to relate theory to practice. When presented with the results showing that practical activities about themes created the most learning, all students used statements as “of course,” and explained that this method made them relate the theory to practice. Sebastian described how he learned from practical activities presented at the university: “When I read about theory, it is just a theory, and the practical activities give us the opportunity to see how they work.” Monica concurred that theoretical themes must be focused on in practical activities:

When we have practical activities, it is vital that the lecturer focus on the theoretical themes, asking the students relevant questions, giving feedback and planning for reflections amongst the students on relevant aspects of the theme.

When Susan was asked about her thoughts on her own learning through practical activities, she replied:

I think that's great, because it's very nice to get a hands-on approach to something you have just had a theoretical approach to, and it's also having a lot to do with our approach to the practical aspect being not just activity, but it's much better to pause, talk and discuss.

Several students emphasized the need for the lecturer to allocate ample time for feedback and discussions from practical activities to improve learning outcomes. Additionally, students noted that the knowledge applied in practical activities was more memorable than that merely discussed in lectures. All the students agreed on the critical importance of a clear link between the theoretical concepts covered in lectures and the practical activities within the same course. They clearly communicated that without this connection, little learning would occur. This is well highlighted in Kevin's statement:

I learn more from the practical aspect, both here when you have hands-on experience and in high school when we had practical classes. When you sit down and do things, you notice what goes wrong more than when you only write about it theoretically. It's difficult to see what's going wrong if you are just supposed to write a plan and explain. Then, it can seem quite good in your head, but be poor in practice. I like to do things, so it's generally about getting to do it, the practical aspect.

When Kevin was asked to discuss a time when he felt that he received good learning from what occurred at school, he said: “It's mostly the lessons where we either have practical teaching first and then we link it to theory afterwards, or the other way around.” Deborah also stated: “Physical education is a practical subject, so it does not matter how much you have read about basketball or volleyball if you have not tried to play it”.

## Practical activities are about future employment

The fourth main finding from the interview data analysis revealed that students identified practical activities as yielding the highest

learning outcomes and ascribed this to their relevance to future work. Practical activities were a part of the schedule in this actual course. Often, the students received the responsibility to plan and execute lessons for their peer students based on relevant theory. Susan explains her experience in the following way:

When we plan and execute teaching for our peer students, it is a very good and relevant training for us who are future teachers. I experience good learning from this task, where it helps me to evaluate and understand the theory better. We have had several practical activities about the lectures this semester, and it has helped my learning a lot.

Other students confirmed that when they received actual training on aspects that were directly related to their future employment, the learning outcomes were excellent. They argued that, in fact, there could not be too much practice of the teacher-role within their education, and that this strategy assisted them to successfully combine theory and practice. Kevin exemplifies this:

An advantage is that then you see the totality, the lectures will not be too long, and you will be told quite thoroughly what we are going to go through, and then you will do the practical part. If we create a teaching plan or something else in a group or alone, and then go into the hall and carry it out, it will be exactly what we will be doing when we get out as teachers. I really like this strategy. I learn a lot and am very much in favor of it being very practical [...]. You simulate exactly what you will do at school as teachers.

When Deborah was informed that the students reported the most learning through practical activities, she replied: “Of course. It is about doing what you will do as future teachers at school.” When Oliver was asked to discuss a time when he felt that he received good learning from school, he stated:

It is most often when you are out in practice. In our practice, we visited someone in the city with a disability, and it was very educational. When you get out and actually experience what is being talked about, instead of just talking about things.

## Practical activities – the importance of being active

The fifth and final major insight from the interview data analysis was that students viewed practical activities as a platform for active participation, rather than merely sitting passively and listening to the teacher. Confronted with the statistical analyses showing that practical activities were reported to produce the highest learning outcome, none of the students were surprised by this result because it provided them with the opportunity to be active. George explained:

I think when we have practical exercises about issues we have discussed in lecture, we remember the principles better. Furthermore, it is motivating. We have started in this field because

we enjoy physical activity. So, when we get the opportunity to do something actively, we are happy.

Sebastian echoed George’s sentiment, and stated, “I think I learn more from practical activities because I enjoy being active, while I do not learn just as much sitting in a lecture because I want to do things.” Kevin remarked, “It is quite clear that it is motivating to be active yourself versus sitting for 4–6 h. So, it pays off well, I like it. First, I hear it [the theory], and then I feel it in my body.” When Susan was asked what advantages and disadvantages, she sees in practical activities compared to lectures, she answered:

The advantages are that you feel it in your body after hearing about it. So, it is more motivating to be in motion than to sit still, and there is an opportunity for interaction with others. I do not know if there are so many disadvantages [...]. For example, if it’s dancing and you hate dancing, then I’d say it’s a disadvantage. But that sounds like a rarity for me, who likes all-round activity, so it would take a lot for there to be some practical disadvantages.

The interview data revealed that numerous students faced challenges with dyslexia and maintaining concentration during reading and listening to lectures. Therefore, the efficacy of practical activities was very high for them. Additionally, some students noted that incorporating practical activities into the schedule enhanced social interactions and fostered greater engagement between students and the lecturer.

## Discussion

The main findings of the statistical analyses were that practical exercises related to lecture themes resulted in the highest learning outcomes according to student reflections, whereas traditional lectures were found to yield the lowest learning outcomes. These findings are in accordance with other literature that evaluates the effectiveness of lectures as a pedagogical approach in university subjects (Freeman et al., 2014; Damsa et al., 2015; Goodman et al., 2018).

We argue, however, that even if the results showed that there were significant differences in students’ reflections about their learning outcomes across various pedagogical methods, the descriptive data revealed a high average rating of learning outcomes for all methods experienced during the semester in a master’s-level PE course (Figure 1). In other words, in general, the students reported very good learning outcomes from practical exercises related to lecture themes and identified good to very good outcomes from all other methods, with the notable exception of lectures. These findings show that the students generally perceived positive learning outcomes from most pedagogical methods.

## Lectures as a pedagogical approach

The results indicated that, among the eight pedagogical methods, lectures were identified by students to produce the worst learning outcomes. However, the analyses of students’ reflections revealed that lectures could be led to positive learning outcomes if

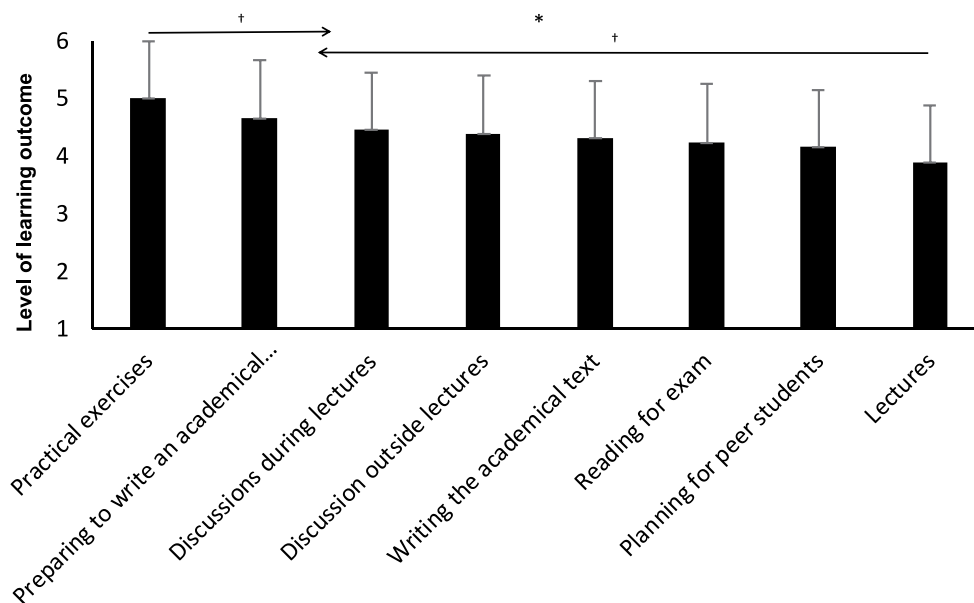


FIGURE 1

Students' reflections of their learning outcomes in eight different pedagogical approaches on a scale between one and six, where six was the highest score. \*Significant difference between the groups ( $p < 0.001$ ). † Practical exercises that were significantly different from the approaches are to the right of the arrow ( $p < 0.001$ ). Lectures that were significantly different from the approaches are to the left of the arrow ( $p < 0.001$ ).

certain conditions were fulfilled. These findings are in accordance with Miller et al. (2013), who reported that when the lecturer organized small “breaks” in the lectures by involving the students in different activities, this resulted in several positive outcomes (Miller et al., 2013). Furthermore, all of the students agreed that the efficacy of lectures depends on the characteristics and skills of the lecturer, which is consistent with the results of a previous study (Bates et al., 2018). They stated that some of the lectures were more interesting to listen to than others, which could be ascribed to the theme and the student's interest in it, as well as to how the presentation was made. The students also expressed appreciation for lectures if new theories were presented in an understandable manner, and when the relevance to their future teaching careers was evident. Indeed, the PE students in the present study shared the opinion that lectures play a valuable role in universities (Bates et al., 2018). However, they also highlighted the importance to their learning outcomes of how the presentations in lectures were organized. All the students, however, agreed that greater student involvement, engendered by the lecturer, leads to improved motivation and learning. These findings are similar to those of other investigations focused on how the effectiveness of lectures can be increased (Brown and Bakhtar, 1988; Al-Modhefer and Roe, 2009).

The analyses of in-depth interview data revealed that the students often found lectures to be long and unstimulating. This finding is supported by other studies that assess the efficacy of lecturers and find that lectures often make students into passive listeners (Young et al., 2009; Wieman, 2019). One explanation for this may be that the lecturers, who are often relatively more focused on research, may not always be adequately prepared for teaching (Vabø and Ramberg, 2009). Another factor could be the increasing diversity among

students at universities currently (Damsa et al., 2015), in which the heterogeneity in their motivation and prior knowledge levels could influence their learning outcomes in lectures. In fact, this argument was expressed by Kevin in the Results section. In accordance with Benneworth et al. (2016), our findings identify an important challenge with teaching at universities: there are no methods that suit all students. For example, lectures conducted at a high academic level cater to certain students, but not all students. This might stem from teachers perceiving an overwhelming number of outcomes, so that they choose to present continuous lectures that are replete with advanced academic content, as suggested by Lujan and Dicarolo (2006).

In the Results section, Deborah pointed towards the possibility of students to divert their attention away from lectures, instead focusing on other activities on their computers. A similar finding was reported by Miller (2013), who found that students were often unengaged in lectures, and chose instead to send emails, send text messages, or engage in other activities on their computers.

During the interviews, the students suggested several solutions to prevent lectures from being long and unstimulating, emphasizing the importance of discussions and integrating lectures with practical activities. Furthermore, the students reported that when lectures facilitate interactions between the lecturer and students, the learning will increase and certain issues, such as low motivation and boredom, will decrease. In aggregate, we argue that while lectures can constitute an effective pedagogical strategy that offers substantial learning benefits, it often fails to do so due to its protracted nature. This is supported by another study in which a significant number of university students reported experiencing boredom in lectures, with 59% feeling bored at least half of the time and 30% feeling bored most or all of the time (Mann and Robinson, 2009).



## Practical activities as a pedagogical approach

The statistical analyses showed that among the eight pedagogical methods, practical exercises were rated as having the highest learning outcomes according to student reflections. The qualitative analyses of in-depth interview data suggested three reasons for this: (1) the ability to relate theory to practice; (2) the relevance of practical activities to future work; and (3) the active engagement that these activities promote among students. Many students emphasized the importance of applying theory and practical context and seeing firsthand how theoretical concepts function in real-life scenarios. We contend that these findings underscore one of the major challenges in education: the necessity of bridging the gap between academic learning and its practical application in real life. Without this connection, the true value of education could be dubious. This finding closely aligns with Dewey (1916), who asserts that linking theory to practice imbues the learning process with purpose. Dewey emphasizes the necessity of theory being grounded in practice, and posits that effective learning is challenging without engaging the student and building upon his or her prior experiences and expectations. In accordance with Dewey's philosophy, students should engage with theories that they find both relevant and interesting to achieve optimal learning outcomes. Even if the theory of Dewey was created long time ago, previous research have shown that Dewey's pedagogy and philosophy still play a role in schools' daily practice (Berg, 2013; Little, 2013; Lagestad, 2014; Sadovnik et al., 2017).

In relation to connecting theory to practice, Biggs and Tang (2011) identify two crucial factors for effective student learning. The first factor is the perceived value of the learning material to the learner. A purely theoretical approach can diminish the perceived value, as explained by Sebastian. In this study, all students reported positive learning outcomes of a combination of lectures and practical activities related to the lecture topic. They emphasized the necessity of a direct link between the two pedagogical approaches to facilitate meaningful learning experiences. Students also noted that focusing on the same theme made the material both theoretically and practically memorable. In addition, the students underscored the importance of an active role for the lecturer in determining the learning outcome. It is crucial for the lecturer to design practical activities with sufficient time allocated for posing relevant questions to students, providing feedback, and facilitating reflections on the connection between theory and real-life applications. Indeed, this approach is in line with the educational strategies supported by Dewey (2008).

Our discovery that students value diverse pedagogical approaches for the same theoretical concept is in accordance with findings from extant literature (Penson, 2012; Regmi, 2012). Based on student responses in interviews, incorporating practical activities as part of an active learning strategy enhances their engagement, involvement, and depth of learning. Similar findings are also reported in several previous research papers (Lea et al., 2003; McCabe and O'Connor, 2014; Sørensen et al., 2023).

In the context of this study, students were tasked with planning and delivering lessons to their peers on pertinent theoretical subjects. The students viewed this as valuable preparation for their future

teaching careers. Moreover, it provided them with an opportunity to critically assess and gain a deeper understanding of the theories involved (Dewey, 2008). The participants in this study were PE students, suggesting a natural inclination toward practical activities and sports. As one of the students responded, "When I enjoy being active, it helps me to learn better from being active." The findings that students appreciate practical activities related to future work, is also reported in other studies (Lagestad, 2014).

## Final reflections

According to Biggs and Tang (2011), the main goal for teachers and lecturers globally is to assist students to achieve their full learning potential. Unfortunately, no definitive formula for effective teaching currently exists. In fact, the discussion on enhancing student activity through varied teaching methods to improve learning outcomes has been ongoing for decades, as evidenced by studies from Young et al. (2009) and Wieman (2019). Research indicates that lectures that lack depth can result in passive and unmotivated students, while overburdening students with responsibility in education can also produce adverse effects (Bremner, 2019). Consequently, pedagogical experts in higher education recommend employing a combination of different approaches to achieve an effective balance in teaching (Lea et al., 2003; Bremner, 2019).

The main findings of our study indicate that while students acknowledge that lectures have the potential to facilitate good learning, they often fall short of achieving this. In contrast, practical activities that are theory-based were found to be effective in learning, relevant for future teaching careers, and enjoyable. We recommend that lecturers in other subjects perform similar experimental research to better understand student reflections on learning through diverse teaching methods and approaches. Indeed, this advice is in accordance with Biesta (2013), who describes learning as a risky endeavor without a fail-safe "recipe" for success. We also argue that our findings resonate with the ideas proposed by Regmi (2012), who emphasizes that the debate should not center on whether to use lectures as a teaching method, but rather on how to structure teaching using a range of methods to optimize learning outcomes.

## Strength and limitations of the study

The study has a mixed-methods design, in which quantitative data about eight traditional pedagogical methods are followed-up by in-depth qualitative data about these methods, which is a notable strength. Furthermore, the quantitative data encompass students from three distinct year groups, which adds diversity to the findings. However, this study is not without certain limitations. From a critical perspective, it is possible that the PE students may have overrated practical exercises due to the enjoyment that they derived from these activities. On the other hand, considering that the participants were in their third year of teacher education, they likely possess a more informed perspective on their learning development, supported by both their teaching experiences and their role as educators in high schools and colleges.

Moreover, we suggest that students' capacity to accurately assess their learning outcomes in relation to different pedagogical methods might be challenging. For instance, in a study in which actual learning outcomes were compared with perceived learning, students felt that they learned more from lectures than student-active methods. However, when assessing the actual learning outcomes, it was found that student-active methods were more effective than lectures (Deslauriers et al., 2019). This discrepancy highlights the complexity of measuring and understanding learning outcomes, and the importance of considering both perceived and actual learning in pedagogical strategies.

## Conclusion

This study investigated students' perceptions of their learning outcomes from eight traditional teaching methods in a masters-level PE course, utilizing a mixed-methods approach. The quantitative analysis revealed that practical exercises resulted in the highest learning outcomes, while lectures were found to yield the lowest. The qualitative analysis, which involved in-depth interviews focusing on these two teaching methods, showed the importance of students connecting theory with practice. Additionally, these activities were perceived as more relevant to future professional roles compared to other methods, and they encouraged active student participation, which was viewed positively by PE students. Lectures were frequently perceived as long and unstimulating, largely due to students feeling that many instructors failed to engage them in discussions. Considering the findings, it is suggested that student teachers obtain the ability to plan and implement practice lessons that are related to themes in lectures, and actively involve students in discussions during lecture sessions, in order substantially enhance engagement and learning.

## Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repository and accession number(s) can be found in the article/supplementary material.

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## Ethics statement

The studies involving humans were approved by Norwegian Agency for Shared Services in Education and Research. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

## Author contributions

AS: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. PL: Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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