Students' Assessment of Learning in a Volleyball Course at a University: A Mixed Methods Study

Ivar Fossland Moa *, Pål Lagestad and Arne Sørensen

Department of Teacher Education and Arts, Nord University, 8026 Bodø, Norway; pal.a.lagestad@nord.no (P.L.); arne.sorensen@nord.no (A.S.)
* Correspondence: ivar.f.moa@nord.no

Abstract: The aim of the study was to evaluate students' assessment of their learning after a teaching period of volleyball training in a university course. The teaching was research-based and linked to relevant theories of motor learning, small-sided games (SSG), teaching games for understanding (TGfU), and motivational climate. To examine the research question, a mixed methods design was used, which included a questionnaire and reflection notes from the students. The questionnaire data constituted the basis for an analysis of the students' reported development in their skills and knowledge in four relevant learning outcomes, while the qualitative data provided more in-depth data related to their learning. The statistical analyses showed a significant increase in the experience of skills and knowledge in all four relevant learning outcomes related to the curriculum of the course. From reporting poor or medium goal achievement prior to the course, the students, in general, reported good goal achievement after the course. The thematic analysis of the reflection notes supported these findings, in which game activities in small groups were especially identified as positive. Furthermore, the students stated that the teacher and a learning-oriented motivational climate were crucial in contributing to a positive learning environment. Some of the students reported too little instruction and feedback from the teacher during the course. The students expressed a few suggestions for changes to the content and methodology of the teaching. The study indicates that this type of research-based teaching may be important to produce a positive learning outcome for students. Our finding is consistent with previous research, which identifies which elements should be emphasized when implementing training in this subject area. As the survey only had 30 respondents and the design did not contain a control group, caution should be exercised when drawing strong conclusions from this study.

Keywords: research-based teaching; students' self-assessment; learning outcomes; teaching practice; small-sided games; teaching games for understanding

1. Introduction

According to the recommendation from the Norwegian Ministry of Education and Science "Culture for Quality in Education", substantial potential exists for improvement in the quality of teaching in higher education [1]. The Ministry asserts that universities need to change their practice regarding teaching, and it provides guidance on how the interaction between research and education can be enhanced. Norwegian universities are legally required to conduct research-based teaching [2]. However, no clear explanation exists concerning precisely what this term entails, and research-based teaching can be interpreted in different ways [3,4].

Research-based teaching includes students receiving training in relevant research methods, taking part in research projects, developing a critical understanding of established truths, and developing professional curiosity through engaging in student-active methods [1]. However, it has been argued that this view of research-based teaching is too narrow. For instance, Grythe reported that teachers must also utilize teaching methods

that [5], through research, have been shown to produce the best possible learning outcomes. Indeed, the Ministry of Education and Research highlights the importance of lecturers in higher education researching their own practice to improve their quality of teaching [1]. Such a strategy involves a critical and investigative examination of one's own teaching. The purpose of this study is to elucidate students' experience of research-based teaching by examining their achievement of specified learning outcomes in a university-level volleyball course.

When investigating teaching within higher education, we argue that the term *constructive alignment* is central [6]. This term means that there must be a match between the learning outcomes that the students must attain by completing the subject(s) and what the teaching and examinations provide. This is in accordance with Hattie's contention that consistency must exist between aims, methods, and assessments in teaching [7]. Specifically, it is necessary to plan and implement teaching that is directed toward what the students will learn according to the learning outcome descriptions of that course.

When carrying out research-based teaching, it is necessary to begin with research on teaching within the subject area to be taught. Therefore, research will now be presented on which this pedagogical experiment is based.

In subjects in which the goal is related to skills acquisition in sports activities, planning exercises based on theories of motor learning is highly relevant. In such theories, the importance of training specifically for the skill to be developed and facilitating many repetitions of the chosen skill is emphasized [8]. Therefore, a substantial amount of the time available should be allocated for exercises with a small number of students in each group, e.g., paired exercises, which are often referred to as small-sided games (SSG). In fact, a substantial body of the extant literature in the field of "learning and developing skills in different ball games" has demonstrated that SSG is an effective and appropriate way to develop such skills [9–11]. It has also been shown that such an organization (i.e., SSG) is more motivating for participants than exercises and activities in which one does not focus on such game activities [12].

The theory of teaching games for understanding (TGfU) emphasizes the importance of specifically practicing the entire sports activity and not just its sub-elements [13]. This theory is based on constructivist learning theory and asserts that activating students through game activities, according to TGfU, will provide effective practice in technical skills and training in making appropriate choices in the activity (tactical choices), which is crucial for learning a sport [14]. In a study on volleyball training for youth, it was demonstrated that TGfU, executed as SSG as 1 vs. 1 and 2 vs. 2, was more effective for the development of skills than "traditional" volleyball training, based on instruction and drill practice, and 6 vs. 6 games. Furthermore, the participants reported a higher level of well-being with this organization of the training [15]. The teacher's role in TGfU should comprise questions and facilitating athlete curiosity and autonomy in relation to skill acquisition [15].

The most traditional learning method currently used in physical education and sports is for the teacher/coach to concretize learning goals, initiate relevant activities that focus on selected skills, perform frequent drill activities, and provide reinforcing feedback in terms of selected learning goals [8]. The effectiveness of this method depends on the context and the instructor's knowledge, and the type of task related to athletes' experiences with similar movements is also associated with the effectiveness of instruction [8,16]. Since this is the most common method used in school and sports, students and athletes expect to encounter it. Indeed, if the instructor possesses thorough knowledge of the skills to be learned and provides feedback on factors that are crucial for skill development, this method can work well [8]. However, if the instructor does not address essential factors or gives incorrect feedback, the efficacy of this method will be markedly diminished [8].

In recent years, the constraints-led approach (CLA) theory has been highlighted as an effective way of learning skills in a sports context [17]. Specifically, its basis is that if the trainer/teacher facilitates learning by changing the environment, exercises, activities, and the trainer's demeanor, the students will be placed in situations in which they

must make independent choices, which leads to greater involvement and learning [17]. Moreover, the use of CLA takes greater account of individual differences between different students/practitioners and allows room for motor development in terms of the prerequisites. In addition, part of the purpose of CLA is that students or athletes are taught to assume greater responsibility for their own learning through which, through a process of trial and error, they identify their own solutions that are successful for them to solve current situations in the game [17]. According to CLA, the role of the teacher is as facilitator and observer, in which the athletes are sometimes asked relevant questions to contribute to skill acquisition [18]. A prerequisite for success in exercises based on CLA is that the coach/teacher possesses in-depth knowledge of the actual sport and is capable of manipulating constraints in the exercise environment in a way that is optimal for the individual athletes [19].

According to Hattie (2012), the most important factor for students' learning is the quality of the lecturer. Concretely, what the lecturer chooses to do and not to do will directly influence the learning outcome [7]. A review of aspects related to the efficacy of the lecturer showed that the most consistent factor was the lecturer's behaviors, such as instructional content and time allocated for specific tasks [20]. Furthermore, the facilitation of substantial student involvement in teaching is highly recommended [21]. In the role of teacher/coach, an equitable balance of certain factors must also be achieved and maintained. For instance, it is key to have relevant academic, pedagogical, and social skills [22]. One of the learning outcomes of the university volleyball course was that the students should have knowledge about how to plan and carry out volleyball exercises. Therefore, it is important that the education that they received included being a good role model for acting as a coach [23]. Essential elements in this role include being a natural leader, possessing good relational skills, and imparting a motivating effect on the students [22].

Research about how motivational climate affects the motivation of students has demonstrated that the learning-oriented climate offers numerous advantages in terms of increasing students' intrinsic motivation and contributing to greater effort [24]. To establish this type of motivational climate, several pedagogical factors have been identified, such as the importance of variety in exercise selection, that the teaching is adapted to the participants' skill level, and that the teacher recognizes participants' different skills. It is also critical that sufficient time is allocated for progression within the development of the athletes' own skills, and the coach should provide information to the athletes about how to improve and give positive and reinforced feedback [25]. In this motivational climate, doing one's best is valued and viewed as an integral part of the learning process [26].

A university-level volleyball course was planned and carried out based on the theories of motor learning, SSG, TGfU, and motivational climate. In accordance with the discussion above, the research question of this study is as follows: how do sports students assess their learning outcomes related to the central learning outcome descriptions in a university-level volleyball course?

2. Method

2.1. Design

A mixed methods design was used to investigate the research problem, in which both numerical data from a questionnaire and text data from the same students' reflections on learning after the course were included. With such a strategy, the aim was to obtain generalizable data and data on change in four learning outcomes through statistical analyses. In addition, the intention was to attain more in-depth information from the students' experience of how and why skills and knowledge changed throughout the volleyball course by using reflection questions. The goal of these questions was to obtain knowledge about the students' thoughts and experiences regarding the pedagogical scheme of the course, the organization of the activities, the learning methodology, the teacher's role, and the learning environment. Furthermore, the students were asked if they had any suggestions for changes in the course that could have increased their learning outcomes.

The volleyball course consisted of 11 teaching sessions (90 min in each session), as well as a practical methodical exam of 30 min (see Table 1). The volleyball course was structured with a main theme for each session, e.g., smash, serve, block, etc. One teacher organized and conducted all the teaching in the course, and the teaching was planned based on the theories of motor learning, SSG, TGfU, and motivational climate in training. In the teaching sessions (e.g., related to the session about the spike, (session No. 6)), exercises and activities were chosen according to SSG and TGfU. Here, specific training based on motor theories was central, in which descriptions were used about how the teacher's role affects the motivational learning climate in a class to describe the ideal teacher's role. In terms of the choice of learning style, an instruction/feedback method was employed in every other session, while approaches based on the theory of CLA were used in the other sessions. The reason for deciding to implement both approaches to learning was not only to be able to obtain feedback from the students about their experiences with them but also because it has been shown that both approaches can be effective under certain conditions [8].

Table 1. Main themes and pedagogical approaches used in the volleyball course.

Session Number	Main Theme	Pedagogical Approach
1	Volleyball training for beginners, training of basic skills, Mini volleyball	SSG, CLA, TGfU
2	Training of basic volleyball skills, hand passing, and bump pass	SSG, INS./FEED. [a]
3	Attacking play, practicing passing for spike	SSG, CLA, TGfU
4	Internal tournament	SSG
5	Course on training of beginners in volleyball, by the Norwegian Volleyball Association	SSG, INS./FEED.[a]
6	Attacking play, spike	SSG, CLA, TGfU
7	Defensive play, receiving a serve	SSG, INS./FEED.[a]
8	Defensive play, block	SSG, CLA, TGfU
9	Attacking play, serve	SSG, CLA, TGfU
10	Student-led lesson, based on defensive play	SSG, INS./FEED.[a]
11	Student-led lesson based on attacking play	SSG, INS./FEED.[a]

[a] = INSTRUCTION/FEEDBACK.

All teaching was planned according to the learning outcomes that the students should have achieved after completing the course. The research project was conducted in accordance with the ethical guidelines for research and was approved by The Norwegian Agency for Shared Services in Education and Research, 18 May 2023, with ref. No. 291362.

2.2. Participants

Based on power calculations [27] related to a previous study [28], with standard deviation (SD = 0.13) and expected differences between groups (0.22), at least 10 participants had to be included in the study. A total of 38 students, divided into two sports classes, were invited to participate in the study (see Table 2). This constituted a strategic selection [29], as one of the authors had all the lessons in volleyball with the two groups. Of these students, 30 chose to answer both the questionnaire and the reflection notes, which yielded a response rate of 79%. The students were aged 19–23, with an average age of 21 ± 1.9. There were 19 men and 11 women in the selection. Only two of the students had previously participated in a volleyball team. The inclusion criterion was that the students had taken part in at least nine out of eleven sessions.

Table 2. Number of participants and age in the two groups.

	Group 1	Group 2
Girls in total	N = 8	N = 7
Boys in total	N = 10	N = 11
Girls in the study	N = 7 (87.5% response rate)	N = 5 (71.4% response rate)
Boys in the study	N = 8 (80% response rate)	N = 11 (100% response rate)
Age in the study	Mean = 21.1 (SD = 1.2)	Mean = 20.4 (SD = 1)

2.3. Procedures

Four questions were prepared based on the central learning outcome descriptions in the volleyball curriculum. These were the following: "I have knowledge of basic skills in volleyball"; "I have knowledge of training methods, key terms, and principles that can lead to skill development in volleyball, i.e., how to plan and carry out training in volleyball"; "I can master relevant skills and techniques within volleyball"; and "I can reflect on my own and others' performance of skills related to volleyball". To record the students' experience, a Likert-type scale from 1 to 5 was used in the questionnaire, with the following answer options: 1—very poor goal achievement; 2—poor goal achievement; 3—medium goal achievement; 4—good goal achievement; and 5—very good goal achievement. The questions were highly reliable because the questions related to learning outcomes were the same as the actual learning outcome descriptions in the course plan. Furthermore, the questions and the answers options also have a high face validity [30] and should not lead to different interpretations of the questions.

Four reflection questions were also developed. The purpose of these was to gain a deeper understanding of the students' learning process, as well as to allow the students to express their own reflections about their own learning. In addition, the questions were designed to obtain the students' evaluation about which parts of the teaching assisted them the most in their learning process. The four questions were as follows: "Can you describe what you think about your own learning in this course, what have you learned, and how have you learned it?"; "What thoughts do you have about your learning in relation to how the course has been organized, with 2 vs. 2 practice, small court games, 6 vs. 6 games, and instruction from teachers?"; "How has my role as a teacher and the learning environment in the course affected your learning?"; and "How do you think the course in volleyball could have been structured in a different way so that you received a greater benefit from the course in relation to how good you became at planning and carrying out volleyball training?".

2.4. Data Collection

The implementation of the questionnaire survey and the answering of the reflection notes occurred after the last volleyball sessions on 13 December 2022. The students filled out a questionnaire and wrote reflection notes in paper format. The research leader was present while the students were answering the questionnaire and providing reflection notes and was available for any follow-up questions.

2.5. Statistical Analysis of Numerical Data

In terms of the questionnaire data, a Shapiro–Wilk test showed that the prerequisites for a parametric test were not present, as the variables were not normally distributed ($p > 0.05$). Consequently, the Wilcoxen non-parametric test was used to determine whether there were differences between the students' experience of skills and knowledge before and after the volleyball lessons [31]. The analyses of the numerical data were performed using the statistical program SPSS, version 28 (IBM, Armonk, NY, USA). All results were presented with mean and standard deviation. The significance level was set at $p < 0.05$, $p < 0.01$, and $p < 0.001$.

2.6. Thematic Analysis of Reflection Notes

The answers to the four reflection questions were read through and analyzed in accordance with thematic analysis [32,33]. According to Braun and Clarke (2006, 2019), thematic analysis is well suited for analyzing students' experiences regarding a specific issue and can identify patterns in students' experiences, views, and perspectives on learning. The first step in a thematic analysis involves familiarizing oneself with the data that have been collected through transcribing and reading through them. The second step was to construct the initial codes based on the meanings that the sentences were determined to have expressed. In line with Braun and Clarke (2006), it was identified themes/codes relevant to answering the research question (i.e., organization of the practical lessons, what the learning outcomes are, why they have been chosen, motivational environment, teachers' role, enjoyment, preferred changes in the course). Consistent with the principles of thematic analysis, the codes were collected and sorted in the third step. Examples of such codes were learning effect, organization of teaching, teacher's role, and learning environment. In the fourth step, these themes were reviewed again and distilled to three main themes which, in the fifth step, were defined and named as follows: SSGs were educational; learning-oriented motivational climate; the importance of the teacher; too little instruction and feedback; and few and widespread wishes for changes to the content of the teaching and organization. All interpretations (codes/themes) that were conducted during the five steps of the thematic analyses were discussed by all three authors to increase credibility and reliability.

3. Results

The results from the quantitative analyses are first presented using statistics and figures, and then the findings from the thematic analysis are given.

Figure 1 shows that, on a scale from 1 to 5, the students' experience of knowledge of basic skills increased from 2.8 to 4.1, which is a significant improvement according to a Wilcoxen non-parametric test ($Z = -4.9$, $p < 0.001$). In practice, this means that a change has occurred in the students' experience from being average to being good in this area of knowledge.

Figure 2 shows that, on a scale from 1 to 5, the students' experience of knowledge of basic skills in volleyball increased from 2 to 3.9, which is a significant improvement according to a Wilcoxen non-parametric test ($Z = -4.9$, $p < 0.001$). In practice, this indicates a change in the students' experience from being poor in this area of knowledge to being good.

Figure 3 shows that, on a scale from 1 to 5, the students' experience of knowledge of training methods, key concepts, and principles that can lead to skill development in volleyball, i.e., how to plan and carry out training in volleyball, increased from 2.7 to 4, which is a significant improvement according to a Wilcoxen non-parametric test ($Z = -4.9$, $p < 0.001$). In practice, this means that a change has occurred in the students' experience in this area of knowledge from being average to being good.

Figure 4 shows that, on a scale from 1 to 5, the students' experience of being able to master relevant skills and techniques within volleyball increased from 2.4 to 4, which is a significant improvement according to a Wilcoxen non-parametric test ($Z = -4.6$, $p < 0.001$). In practice, this indicates that a change took place in the students' experience from being poor to average in this area of knowledge to being good.

3.1. Results Based on Qualitative Analysis of the Reflection Notes

3.1.1. SSGs Was Educational

A main finding in the thematic analysis of the students' reflections was that the use of SSG was experienced as educational and provided a basis for the positive development of basic skills in volleyball. Indeed, all the students stated that they experienced progress in both technical skills and tactical aspects of volleyball. Many students further highlighted that the way that the course was organized, with substantial practice in specific elements in

SSG, imparted a positive effect on their own learning of basic skills and provided valuable knowledge of how to plan and execute volleyball exercises for players at different levels.
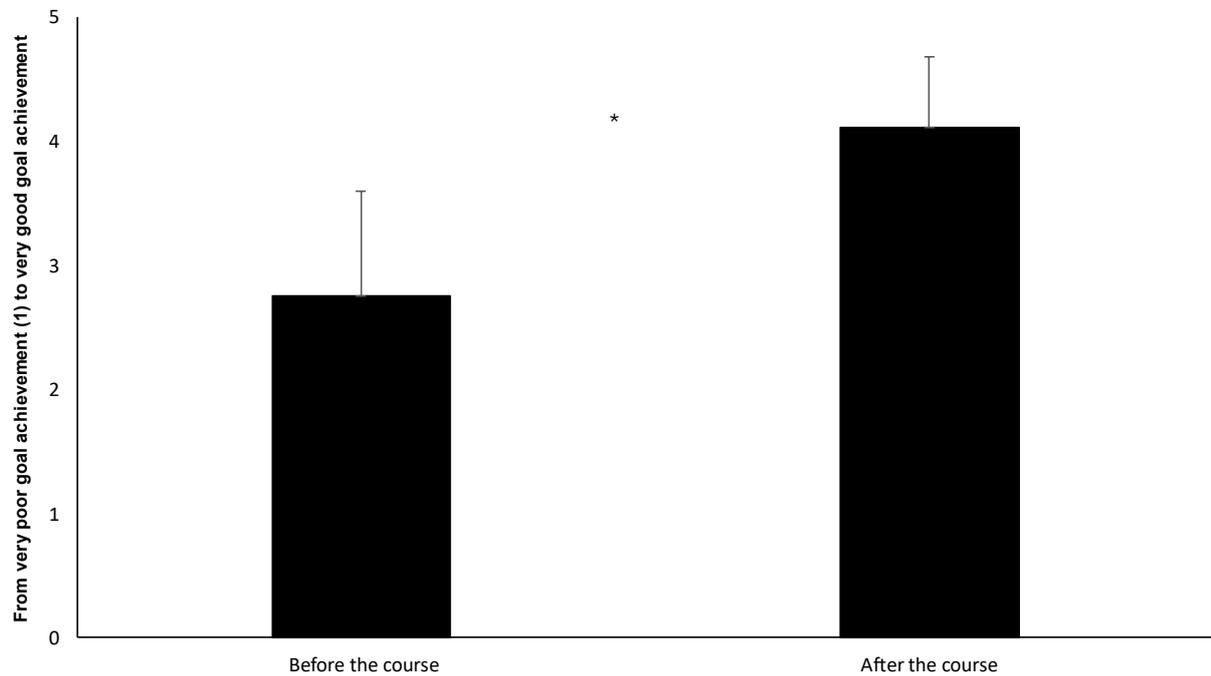
Figure 1. The students' experience and knowledge of basic skills in volleyball before and after the volleyball course. * Indicates a significant increase from before the volleyball course to after the volleyball course ($p < 0.001$).
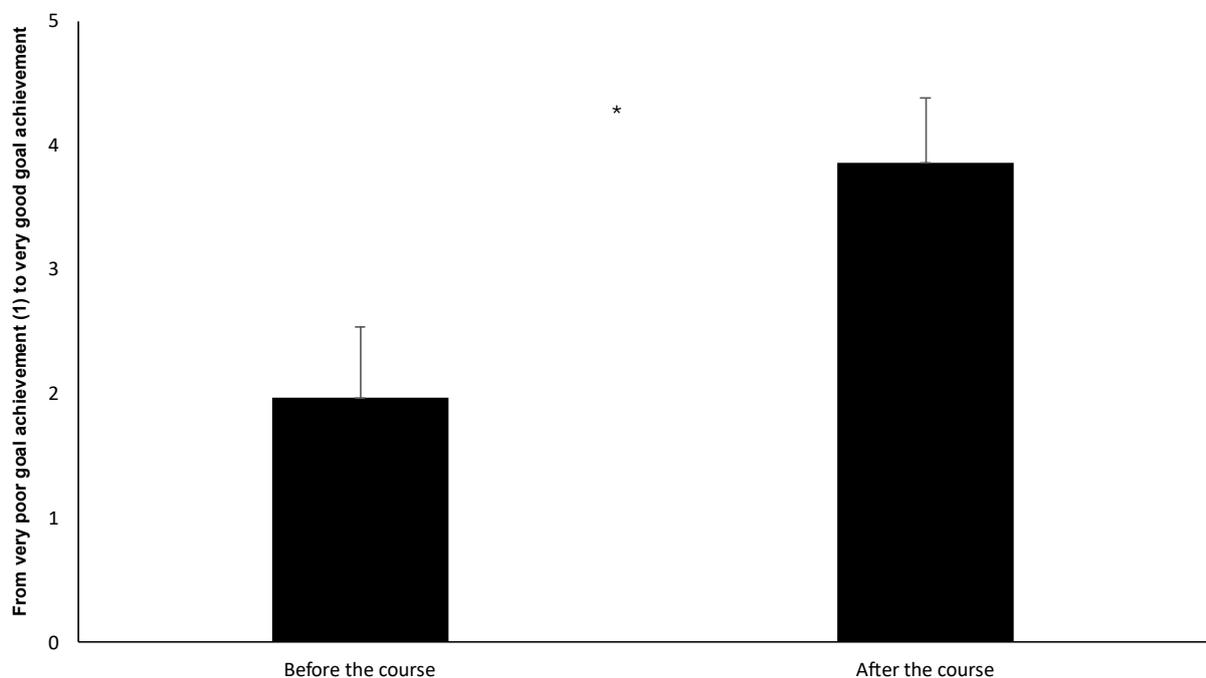
Figure 2. The students' experience of knowledge of training methods, key concepts, and principles that can lead to skill development in volleyball—how to plan and carry out training in volleyball—before and after the volleyball course. * Indicates a significant increase from before the volleyball course to after the volleyball course ($p < 0.001$).
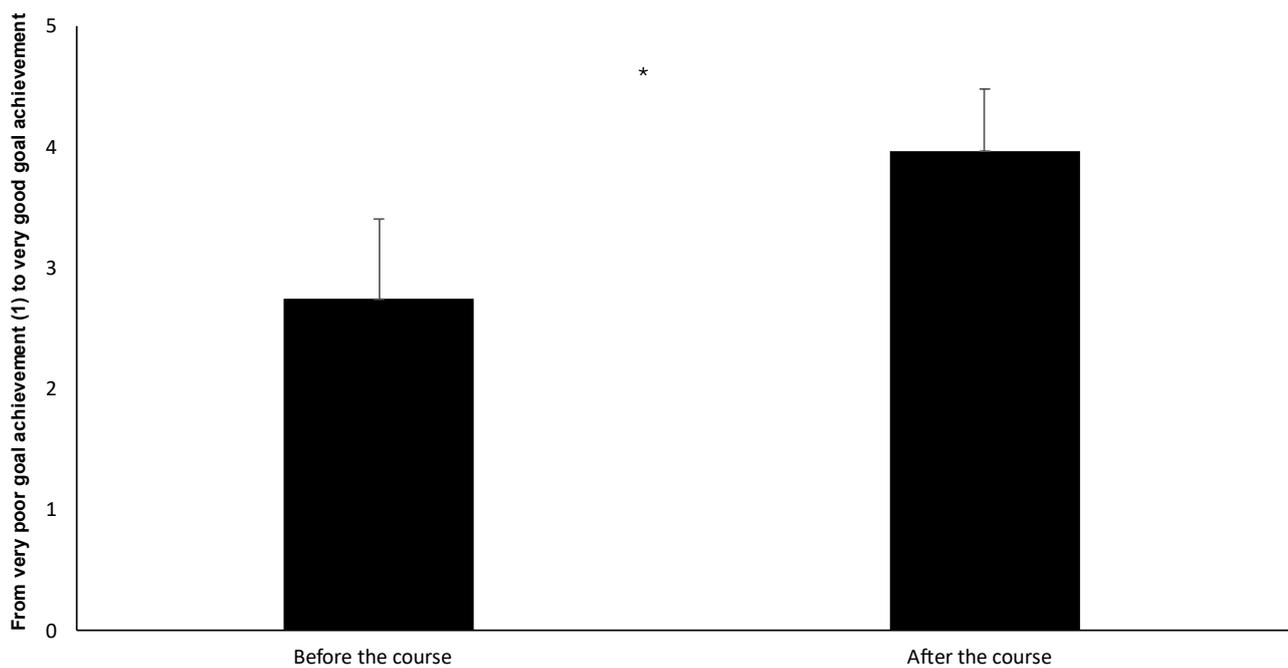
Figure 3. The students' experience of being able to master relevant skills and techniques within volleyball before and after the volleyball course. * Indicates a significant increase from before the volleyball course to after the volleyball course ($p < 0.001$).
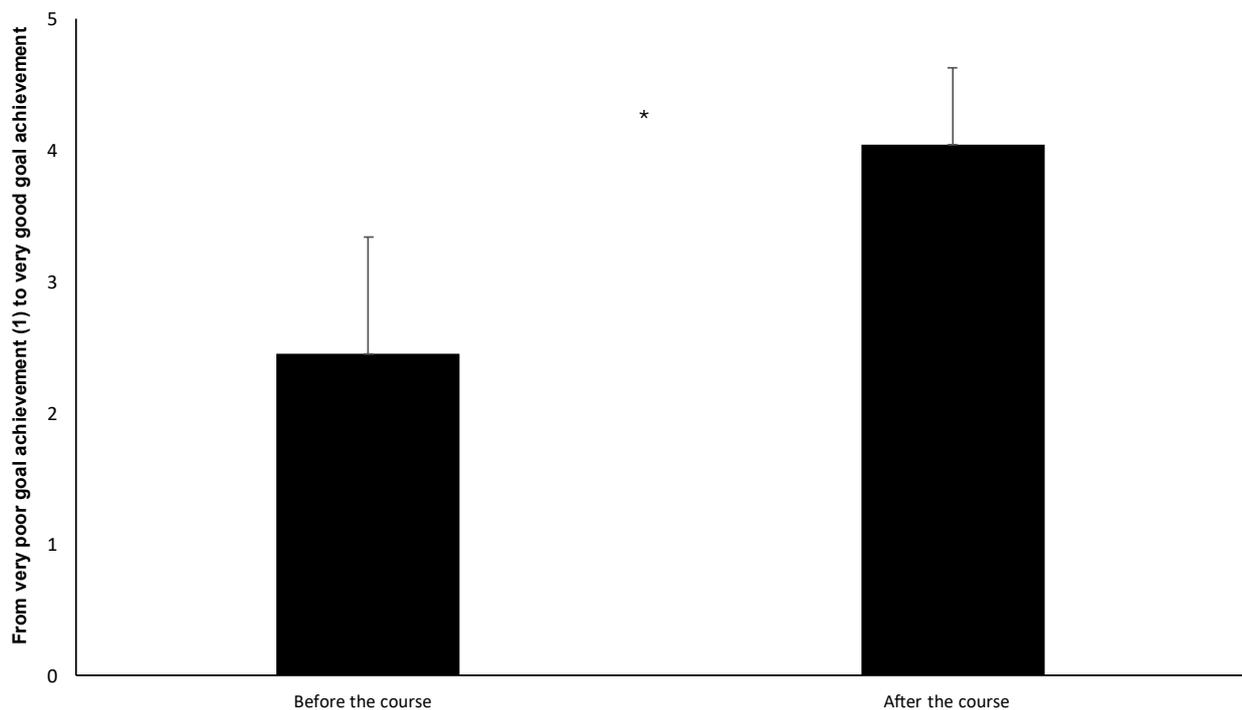
Figure 4. The students' reflections on their own and others' performance of skills related to volleyball before and after the volleyball course. * Indicates a significant increase from before the volleyball course to after the volleyball course ($p < 0.001$).

Most of the answers indicated that SSG had the best learning effect on them. With such a strategy, they experienced being heavily involved in the game, and it provided them with many repetitions in current techniques, as indicated by Peder: "SSG gave the greatest learning benefit, as I have gained the most sense of mastery and the most involvement with the ball from this". Another student pointed out that it was more enjoyable to play

2 vs. 2 compared to 6 vs. 6. Some other students, in contrast, believed that it was more motivating to play 6 vs. 6.

The students' reflections revealed that they had learned several aspects of performance development that they considered to be important, as highlighted by Tommy:

Throughout the course, the teacher has shown ways to conduct volleyball training to facilitate learning, including how one can change exercises and conditions so that it becomes easier to learn something new.

Other students responded that a variety of exercises and activities produced a good learning effect, that it is important to focus on what the trainer/teacher can do to facilitate progress, and highlighted that reflections related to professional issues were effective. Some students also mentioned that a concrete exemplification of various learning theories used during the volleyball course was useful for their understanding of the theory.

3.1.2. Learning-Oriented Motivational Climate

The second main finding from the thematic analysis was that the students described the learning environment as pleasant and educational. This was supported by Peder: "This has been a good learning environment, in which everyone comes to class and wants to play and learn volleyball", as well as Inga: "The learning environment has been good, with a focus on learning and having fun together". But Otto described the learning climate as too much democratic and that the teacher set too few demands on the students.

The students experienced an inclusive learning environment through the volleyball course, i.e., a learning environment that permitted trial and error, in which they felt safe, and in which they encouraged each other. Inga stated the following: "I think the learning environment has been nice, with room for all kinds of levels".

Most of the students stated that they enjoy playing volleyball matches and have a will to win the matches. However, the analysis also revealed that this took place in a learning-oriented climate. Trine explained: "Despite the fact that there is a lot of competition instinct in the group, the students encouraged each other and their development in the volleyball sessions".

3.1.3. The Importance of the Teacher

The third main finding was that the students reported that the teacher had a positive effect on their learning. They described the teacher as being well-prepared and possessing a solid knowledge of volleyball. Celly and Howard emphasized the importance of the teacher making it possible to have fun during the classes: "The teacher has given me good learning, there have been enjoyable sessions, which I learn the best from" and "The role of the teacher has influenced me, and I have liked this sport, and I wanted to earn more", respectively.

The students also pointed out that the teacher was a good leader who had the ability to acknowledge and respond to everyone in class. Ingrid expresses this: "He sees everyone and gives good feedback to each individual".

Furthermore, the students stated that the teacher facilitated mastery by adapting the teaching to their skill level, as well as making space for reflections during the lessons. The teacher was also described as gentle and straightforward, which increased learning. Nancy explained: "I think it was a clear teacher role, and I have learned a lot from the teacher". However, not all the students were as satisfied with the teacher, as indicated by Michael: "The teacher was okay, but too slow in my opinion, and on the verge of being boring with too much explanation and breaks in the games".

3.1.4. Too Little Instruction and Feedback

The fourth main finding was related to the amount of instruction and feedback given to the students during the lessons. Specifically, some of the students experienced too little feedback from the teacher, as Oda explains:

The feedback you gave during technique exercises could have been more constructive because you gave much positive feedback, even if the technique was not always well executed.

Other students, such as Ulla, pointed out the importance of instruction from the teacher both before the lesson started and feedback during the lesson: "I always prefer instruction because my learning improves best with much feedback from the teacher." However, some of the students stated that the teacher provided sufficient instruction and feedback during the lessons.

In the planning of this actual volleyball course, the authors decided to use both the instruction/feedback method and CLA. Ken identifies what he felt was negative about CLA:

Without prior instruction, we had to find the technique to perform the exercise ourselves. With instructions in advance, we could use our time to conduct the exercise at a higher level. I prefer to first have the instruction and then focus on the instruction given during the practical activity.

Others, on the other hand, appreciated the use of different learning strategies during the course. Annie describes this:

It has been important for me that we have experience with different learning methods, especially in which we have been put in situations where we should think and experiment about different techniques and tactical issues during the volleyball course.

Other students highlighted the advantages of obtaining experience with different pedagogical methods. Oliver expresses this: "An important learning outcome for me in this course was how a teacher or coach could facilitate better learning by manipulating constraints to increase learning among the athletes".

3.1.5. Few and Widespread Requests for Changes to the Content and Organization of the Teaching

The fifth main finding from the thematic analysis was related to a few widespread wishes related to changes in how the volleyball course was organized and conducted. Although a few suggestions for changes were made by some students, these were in contradiction to each other, were widespread, and did not provide clear advice on how to make it better. One of the students indicated that there should be more links to training principles in the practical sessions to increase understanding of theoretical aspects. There were also proposals for changes in the choice of exercises and priorities in teaching. One suggestion was that more play activities could be used to learn volleyball. Another student stated that there should be more focus on training basic skills prior to bringing them into game situations at the end of the sessions. Another proposed change was that there should be more volleyball matches during the lessons.

Various requests for changes were also made in relation to the teacher's role, as indicated by Jan: "The teaching was characterized by a lot of stops in the activities, and it was on the verge of being bored with "over-explanations"". However, this reflection was somewhat in contrast to what most of the other students stated. In their opinion, the teacher should have been clearer on the instructions for individual students and on what was good and bad in game situations because this would have produced more learning about the game of volleyball.

4. Discussion

4.1. Significantly Increased Learning in All Four Learning Outcome Descriptions

The results from the quantitative analyses showed that the students' experience of learning increased significantly in all four learning outcomes ($p < 0.001$). The biggest change was in relation to the students' experience of knowledge of training methods, key concepts, and principles that can lead to skill development in volleyball, i.e., how to plan and conduct training in volleyball before and after the volleyball course. Here, the students'

experience increased from being poor before the volleyball course to being good after the volleyball course.

The quantitative results revealed that the students assessed their goal achievement to be poor or medium before the course started to good after the course had finished. The analyses showed that the course provided the desired improvement in skills/knowledge in terms of the learning outcomes of the course. In fact, when the quality of teaching in higher education is evaluated, this is the overarching goal, i.e., not just that the students have learned something, but that they have learned what is specified in the learning outcomes in the curriculum, which is termed *constructive alignment* [6,34]. Here, it is worth mentioning that a weakness in the analyses of the quantitative data is that the number of respondents was low. This is a common challenge when researching one's own teaching, as the number of students in each group is rarely large [35]. Moreover, as the study's design does not include a control group, it is not possible to definitively conclude that the chosen research-based teaching is more effective than other ways of organizing teaching.

The results presented in Figure 1 showed significant progress in terms of the students' reflections on their own knowledge of general skills in volleyball. This is probably because the students were physically active through various volleyball activities, and the teaching was based on the theory that training for ball games should be organized with game activities with few players on each team (SSG and TGfU). According to the students' assessments, they also increased their ability to reflect on their own and others' skills in volleyball. This may be attributable to the fact that much of the course was organized according to the theory of TGfU [13]. The principle here is that when one is frequently put in a game situation, the practical experiences that one establishes will lead to new learning.

4.2. Qualitative Analysis of the Reflection Notes

4.2.1. SSGs Was Educational

The results from the qualitative (thematic) analyses supported the quantitative analyses and showed that the students experienced positive development of their own skills in volleyball, both theoretically and practically. This finding supported the results from the quantitative analysis. Overall, the students reported that using SSG had a positive effect on learning outcomes.

The results from the qualitative analyses of the reflection notes revealed that practicing technical and tactical skills with small games with few players in game situations (SSG and TGfU) was experienced by the students to be highly educational. This is in accordance with the literature that reports that this type of organization of training provides advantages for both performance improvement and motivation in the training sessions [9,12,15,36].

This type of approach to learning differs from the more traditional way of understanding learning, in which one must practice basic skills before they can be utilized in the game itself. The concept behind SSG and TGfU is that training in these basic skills can be even better achieved through solid preparation in game situations. Thus, the students' assessments were in line with findings from pertinent research.

It was also a goal of the teaching that the students should develop theoretical knowledge of volleyball and how they should facilitate learning. The students' feedback revealed that they felt that their tactical skills in volleyball had increased, which can presumably be ascribed to the organization of the course using SSG and TGfU [9].

Both the quantitative and qualitative findings showed that the students reported significant improvement in their own volleyball skills after completing the course. This is in accordance with motor theory, which asserts that specific training will lead to improvement in relevant skills [8]. The students stated that few of them had been active in volleyball prior to the course, which means that they began at a low skill level. According to the theory of the power law of practice [8], progress in skills initially takes place quickly, but when the skill level increases, a lot of practice is required to continue to advance in skill level. It is also worth mentioning that the students' assessment of their own learning is

used in this study and not the real learning outcomes. Indeed, research has demonstrated that an experience of learning can be different from real learning [37].

4.2.2. Learning-Oriented Motivational Climate

The reflection notes revealed that the students described the motivational climate during the volleyball course as enjoyable and educational. When there was acceptance of failure without any risk of negative reactions from the teacher or peers, the students also reported high enjoyment and satisfaction.

These findings indicated that a learning-oriented motivational climate existed during the volleyball course [24]. Typical characteristics of this type of motivational climate are that the teachers plan for a variety of exercises and implement teaching that is appropriate for the students. When the teacher facilitates a learning-oriented motivational climate, there is a greater probability of higher levels of intrinsic motivation and effort [24].

The students reported high enjoyment in the volleyball lessons, which could be a consequence of positive and reinforcing feedback from the teacher and/or peers [25]. As the course was organized so that there was a learning objective that was emphasized, the students had sufficient time to practice requisite skills. In fact, it is essential for athletes/students to experience inner motivation during activities [38].

4.2.3. The Importance of the Teacher

According to the students' reflection notes, the teacher played an important role in their learning in the volleyball course. These findings correspond with Hattie [7], who claims that one of the most important things in terms of students' learning is the quality of the teacher. The students reported that the teacher's role was important because he was well-prepared, had good knowledge of volleyball, gave relevant feedback, and was a good role model. This indicated that the students' experiences of their teacher's choices and priorities in the present study are in accordance with what Hattie [7] and Burroughs et al. [20] argue are central characteristics of a good teacher.

In an initially homogenous group of sports students, there will always be different perceptions of how the teacher should behave and approach learning [39]. One of the students expressed that there was too little constructive individual feedback about the execution of technical elements, whereas another believed that the instruction from the teacher was too elementary. It was found that the students' preferences and opinions about effective teaching were different [40]. For this reason, it is critical that the teacher chooses different types of activities and approaches to adapt optimally to the diversity of the student group.

4.2.4. Too Little Instruction and Feedback

Half of the sessions in the volleyball course were planned and implemented according to the theory of CLA. This theory contends that learning can be positively influenced by giving students greater responsibility for their own learning and that adjustments to the constraints involved could facilitate better learning. The remaining half of the course, on the other hand, was designed based on the more traditional teaching method in physical education and sports, in which the teacher/coach shows and explains what is correct and incorrect and gives clear feedback on the performance of students/athletes [8].

The analyses of the reflection notes from the students pointed to different opinions about which methodology they preferred and experienced as the most educational. Research has demonstrated that CLA can provide a superior learning effect and greater well-being than the more traditional instructional method [17,18,41].

The more traditional method can also be effective if it is conducted effectively. It requires that the instructor possesses solid knowledge of the skill to be learned and takes the practitioners' assumptions into account [8]. A possible explanation for the students' perceived increased knowledge about volleyball training could be that using both learning

approaches gave the students more ideas about how volleyball training can be organized and carried out.

4.2.5. Few and Widespread Requests for Changes to the Content and Organization of the Teaching

The qualitative thematic analysis of the reflection notes revealed that most students did not want changes to the organization or content of the teaching, and the course was relevant for the development of their knowledge and skills in relation to the learning outcome descriptions.

However, one of the students thought that there should be more focus on training basic skills before taking such skills into game situations at the end of the sessions. The feedback from the students also showed that some wanted a more defined teaching role in which students were provided with clear feedback on their achievements and how they could develop further. Both factors seem reasonable, as this is the most used method approach in sports and physical education [8].

4.3. Final Reflections

The teaching in the volleyball course that constituted the basis for this study was planned as a combination of the constraints-led approach (CLA) and more traditional teaching, in which the teacher shows and explains, the students practice, and the teacher gives individual feedback. In the reflection notes, some of the students called for a more active teacher who explained and guided the students. One of the explanations for this finding may be that the use of CLA in a training context is not ubiquitous, and thus, the use of CLA is a different approach than what the students expect to encounter. To explain and prepare the students for how the teacher planned each session, the argument is that the teacher in this course should have provided more information about the type of approach used in the different sessions.

Our findings also showed that the students responded positively to research-based teaching, and they believed that this produced a good learning effect. For this reason, the recommendation is that others who work with teacher training should use teaching based on research to achieve effective methodology and pedagogy as a central approach. As our course dealt with the sport of volleyball, relevant theory about volleyball training was chosen as the basis for our teaching plan. In line with our findings, the advice to teachers/lecturers who work with other subjects is to familiarize themselves with research about effective teaching in their field and base their teaching plans on these studies.

A strength of the study is that it measures students' experience of developing knowledge and skills during a volleyball course, which means that actual perceived learning is measured, including questions with a high face validity. Another strength is the mixed methods design of the study, which combines quantitative and qualitative analyses of the same phenomenon, increasing the reliability and validity. The use of reflection notes enables the students to highlight their learning experiences. In this way, the quantitative analyses are validated, while the qualitative reflections explain and provide more depth about the problem area. However, the study has some limitations. As highlighted earlier, the study's design does not include a control group, so caution should be exercised in concluding that research-based teaching is more effective than other ways of organizing teaching. This statement is supported by the fact that the study only included questionnaire data from 30 respondents. A larger group would have been preferable. The ability to generalize and extrapolate the findings to other fields is also somehow constrained due to the uniqueness of the sample and the lack of random selection of the participants. Furthermore, previous research highlights that differences may exist between reflections of the learning outcomes and the actual learning outcomes [37].

It would have also been a strength of the study if it had carried out a similar survey prior to the teaching period as a basis for comparison against our post-test. At the same time, reflection notes from 30 students are considerable, and the mixed methods design

increases the credibility. However, future research should involve experimental designs with a larger sample of randomly selected students.

5. Conclusions

The statistical analyses in this study showed that the students reported significant improvement in their perceived knowledge and skills in relation to key learning outcomes in a university volleyball course for future physical education teachers. The students' knowledge/skills were identified as being poor or average before the course started, while they were perceived to be good after the course concluded, according to students' self-reports in a questionnaire. The qualitative analysis of the reflection notes supports these findings.

Analyses of the students' reflection notes revealed that a lot of games in small groups (SSG) produced a good learning effect, which supports the quantitative analysis. Furthermore, the students described a learning environment characterized by well-being and comfort, and without the fear of not performing well enough, i.e., a learning-oriented motivational climate. In terms of the teaching role, the students stated that it was highly beneficial that the teacher was well-prepared, possessed solid knowledge of volleyball training, and was confident and calm in the role of teacher/coach.

The analyses of the students' reflection notes also revealed that the students had few suggestions for changes to the course to create greater learning outcomes. However, it was clear that the students differed in their ideas about how they learn best. This finding points to the importance of a variety of training methods and feedback to successfully reach all students.

This study contributes new knowledge to an area, the field of sport and physical education, that has been relatively little researched according to students' experience of learning within. The practical implications of the study are that research-based teaching should be used to a greater extent, with the intention of significantly improving the learning outcomes of the students. Here, it is critical that teachers familiarize themselves with research into teaching methodology and pedagogical direction, which has been demonstrated to provide optimal possible learning outcomes for the students. Another practical implication of the study is to use a lot of games in small groups (SSG) and organize a learning-oriented motivational climate for sport-related courses at universities to increase learning outcomes.

Author Contributions: Conceptualization, I.F.M., A.S. and P.L.; methodology, I.F.M., A.S. and P.L.; software, I.F.M., A.S. and P.L.; validation, I.F.M., A.S. and P.L.; formal analysis, I.F.M., A.S. and P.L.; investigation, I.F.M., A.S. and P.L.; resources I.F.M., A.S. and P.L.; data curation, I.F.M., A.S. and P.L.; writing—original draft preparation, I.F.M., A.S. and P.L.; writing—review and editing, I.F.M., A.S. and P.L.; visualization, I.F.M., A.S. and P.L.; supervision, P.L.; project administration, A.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Norwegian Agency for Shared Services in Education and Research (protocol code no. 291362, 18 May 2023).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data are available from the corresponding author on reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Meld.St. 16 (2016-17). *Quality Cultur in Higher Education*; Ministry of Education: Oslo, Norway, 2016–2017. Available online: https://www.regjeringen.no/en/dokumenter/meld.-st.-16-20162017/id2536007/ (accessed on 27 January 2017).
2. University and University Colleges Act. §1-3 C. In *Act Relating to Universities and University Colleges*; LOV-2005-04-01-15; Ministry of Education and Research: Oslo, Norway, 2005.

3. Børte, K.; Nesje, K.; Lillejord, S. Barriers to student active learning in higher education. *Teach. High. Educ.* **2020**, *28*, 597–615. [CrossRef]

4. Griffiths, R. Knowledge production and the research–teaching nexus: The case of the built environment disciplines. *Stud. High. Educ.* **2004**, *29*, 709–726. [CrossRef]

5. Grythe, J. Forskningsbasert undervisning som evidensbasert praksis? *Nor. Pedagog. Tidsskr.* **2011**, *95*, 386–397. [CrossRef]

6. Kandlbinder, P. Constructive alignment in university teaching. *HERDSA News* **2014**, *36*, 5–6. Available online: https://search.informit.org/doi/10.3316/informit.150744867894569 (accessed on 1 December 2014).

7. Hattie, J. *Visible Learning for Teachers: Maximizing Impact on Learning*; Routledge: London, UK, 2012.

8. Magill, R.A.; Anderson, D.I. *Motor Learning and Control: Concepts and Applications*, 11th ed.; McGraw-Hill: New York, NY, USA, 2017.

9. de Oliveira Castro, H.; Laporta, L.; Lima, R.; Clemente, F.; Afonso, J.; Aguiar, S.; Ribeiro, A.; Costa, G.d.C.T. Small-sided games in volleyball: A systematic review of the state of the art. *Biol. Sport* **2022**, *39*, 995–1010. [CrossRef] [PubMed]

10. Halouani, J.; Chtourou, H.; Gabbett, T.; Chaouachi, A.; Chamari, K. Small-sided games in team sports training: A brief review. *J. Strength Cond. Res.* **2014**, *28*, 3594–3618. Available online: https://journals.lww.com/nsca-jscr/Fulltext/2014/12000/Small_Sided_Games_in_Team_Sports_Training___A.36.aspx (accessed on 7 March 2024). [CrossRef] [PubMed]

11. Sarmento, H.; Clemente, F.M.; Harper, L.D.; Da Costa, I.T.; Owen, A.; Figueiredo, A.J. Small sided games in soccer—A systematic review. *Int. J. Perform. Anal. Sport* **2018**, *18*, 693–749. [CrossRef]

12. Arcos, A.L.; Vázquez, J.S.; Martín, J.; Lerga, J.; Sánchez, F.; Villagra, F.; Zulueta, J.J. Effects of Small-Sided Games vs. Interval Training in Aerobic Fitness and Physical Enjoyment in Young Elite Soccer Players. *PLoS ONE* **2015**, *10*, e0137224. Available online: https://pubmed.ncbi.nlm.nih.gov/26331623 (accessed on 15 August 2015). [CrossRef]

13. Holt, N.L.; Strean, W.B.; Bengoechea, E.G. Expanding the Teaching Games for Understanding Model: New Avenues for Future Research and Practice. *J. Teach. Phys. Educ.* **2002**, *21*, 162–176. Available online: https://journals.humankinetics.com/view/journals/jtpe/21/2/article-p162.xml (accessed on 1 January 2002). [CrossRef]

14. Griffin, L.L.; Brooker, R.; Patton, K. Working towards legitimacy: Two decades of teaching games for understanding. *Phys. Educ. Sport Pedagog.* **2005**, *10*, 213–223. [CrossRef]

15. Batez, M.; Petrušič, T.; Bogataj, Š.; Trajković, N. Effects of Teaching Program Based on Teaching Games for Understanding Model on Volleyball Skills and Enjoyment in Secondary School Students. *Sustainability* **2021**, *13*, 606. Available online: https://www.mdpi.com/2071-1050/13/2/606. (accessed on 8 January 2021). [CrossRef]

16. Hodges, N.J.; Franks, I.M. Modelling coaching practice: The role of instruction and demonstration. *J. Sports Sci.* **2002**, *20*, 793–811. [CrossRef] [PubMed]

17. Renshaw, I.; Chow, J.-Y. A constraint-led approach to sport and physical education pedagogy. *Phys. Educ. Sport Pedagog.* **2019**, *24*, 103–116. [CrossRef]

18. Correia, V.; Carvalho, J.; Araújo, D.; Pereira, E.; Davids, K. Principles of nonlinear pedagogy in sport practice. *Phys. Educ. Sport Pedagog.* **2019**, *24*, 117–132. [CrossRef]

19. Chow, J. Nonlinear learning underpinning pedagogy: Evidence, challenges, and implications. *Quest* **2013**, *65*, 469–484. [CrossRef]

20. Burroughs, N.; Gardner, J.; Lee, Y.; Guo, S.; Touitou, I.; Jansen, K.; Schmidt, W. A review of the literature on teacher effectiveness and student outcomes. In *Teaching for Excellence and Equity: Analyzing Teacher Characteristics, Behaviors and Student Outcomes with Timss*; Burroughs, N., Gardner, J., Lee, Y., Guo, S., Touitou, I., Jansen, K., Schmidt, W., Eds.; Springer International Publishing: Cham, Switzerland, 2019; pp. 7–17.

21. Bernard, R.M.; Borokhovski, E.; Schmid, R.F.; Waddington, D.I.; Pickup, D.I. Twenty-first century adaptive teaching and individualized learning operationalized as specific blends of student-centered instructional events: A systematic review and meta-analysis. *Campbell Syst. Rev.* **2019**, *15*, e1017. Available online: https://onlinelibrary.wiley.com/doi/abs/10.1002/cl2.1017 (accessed on 19 July 2019). [CrossRef] [PubMed]

22. Smuka, I. Teacher role model and students' physical activity. *Pol. J. Sport Tour.* **2012**, *19*, 281–286. [CrossRef]

23. Schumacher, D.J.; Englander, R.; Carraccio, C. Developing the master learner: Applying learning theory to the learner, the teacher, and the learning environment. *Acad. Med.* **2013**, *88*, 1635–1645. Available online: https://journals.lww.com/academicmedicine/fulltext/2013/11000/developing_the_master_learner__applying_learning.26.aspx (accessed on 1 November 2013). [CrossRef]

24. Leal-Sotoi, F.; Carmona-Halty, M.; Dávila-Ramírez, J.; Valdivia, Y. Work engagement, teaching practices with motivational effects, and learning-oriented classroom motivational climate. *Rev. Interam. De Psicol.* **2018**, *52*, 162–170. [CrossRef]

25. Allen, J.B.; Hodge, K. Fostering a Learning Environment: Coaches and the Motivational Climate. *Int. J. Sports Sci. Coach.* **2006**, *1*, 261–277. Available online: https://journals.sagepub.com/doi/abs/10.1260/174795406778604564 (accessed on 1 September 2006). [CrossRef]

26. Soini, M.; Liukkonen, J.; Watt, A.; Yli-Piipari, S.; Jaakkola, T. Factorial validity and internal consistency of the motivational climate in physical education scale. *J. Sports Sci. Med.* **2014**, *13*, 137–144.

27. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed.; Lawrence Erlbaum Associates: Hillsdale, NJ, USA, 1988; ISBN 0-8058-0283-5.

28. Rupp, M.A.; Odette, K.L.; Kozachuk, J.; Michaelis, J.R.; Smither, J.A.; McConnell, D.S. Investigating learning outcomes and subjective experiences in 360-degree videos. *Comput. Educ.* **2019**, *128*, 256–268. [CrossRef]

29.   Johannessen, A.; Tufte, P.A.; Christoffersen, L. *Introduksjon til Samfunns-Vitenskapelig Metode*; Abstrakt forlag A/S: Oslo, Norway, 2016; ISBN 9788279353843.

30.   Holden, R.B. Face validity. In *The Corsine Encyclopedia of Psychology*, 4th ed.; Weiner, I.B., Craighead, W.E., Eds.; Wiley: Hoboken, NJ, USA, 2010; pp. 637–638. [CrossRef]

31.   O'Donoghue, P. *Statistics for Sport and Exercise Studies: An Introduction*; Routledge: London, UK, 2012.

32.   Braun, V.; Clarke, V. Using thematic analysis in psychology. *Qual. Res. Psychol.* **2006**, *3*, 77–101. Available online: https://www.tandfonline.com/doi/abs/10.1191/1478088706qp063oa (accessed on 1 January 2006). [CrossRef]

33.   Braun, V.; Clarke, V. Reflecting on reflexive thematic analysis. *Qual. Res. Sport Exerc. Health* **2019**, *11*, 589–597. [CrossRef]

34.   Biggs, J.; Tang, C. *Teaching for Quality Learning at University*; McGraw-Hill Education: Maidenhead, UK, 2011; ISBN 9780335242757.

35.   Huxley, G.; Mayo, J.; Peacey, M.W.; Richardson, M. Class Size at University. *Fisc. Stud.* **2017**, *39*, 241–264. [CrossRef]

36.   Fernández-Espínola, C.; Robles, M.T.A.; Fuentes-Guerra, F.J.G. Small-sided games as a methodological resource for team sports teaching: A systematic review. *Int. J. Environ. Res. Public Health* **2020**, *17*, 1884. [CrossRef]

37.   Deslauriers, L.; McCarty, L.; Miller, K.; Callaghan, K.; Kestin, G. Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proc. Natl. Acad. Sci. USA* **2019**, *116*, 19251–19257. [CrossRef]

38.   Ulstad, S.O.; Halvari, H.; Sørebø, Ø.; Deci, E.L. Motivational predictors of learning strategies, participation, exertion, and performance in physical education: A randomized controlled trial. *Motiv. Emot.* **2018**, *42*, 497–512. [CrossRef]

39.   Hassel, S.; Ridout, N. An investigation of first-year students' and lecturers' expectations of university education. *Front. Psychol.* **2018**, *8*, 2218. Available online: https://www.frontiersin.org/articles/10.3389/fpsyg.2017.02218 (accessed on 26 January 2018). [CrossRef] [PubMed]

40.   McCabe, A.; O'Connor, U. Student-centred learning: The role and responsibility of the lecturer. *Teach. High. Educ.* **2014**, *19*, 350–359. [CrossRef]

41.   Moy, B.; Renshaw, I.; Davids, K. The impact of nonlinear pedagogy on physical education teacher education students' intrinsic motivation. *Phys. Educ. Sport Pedagog.* **2016**, *21*, 517–538. [CrossRef]