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Accounting Students in the Role of Equal-Status Team Teacher for the Purpose of Knowledge and Competency Development

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Abstract: This study investigates the impact of engaging accounting students in a team-teaching role on their knowledge and competency development in a higher education setting. The research quantifies the knowledge gains from this learning-by-team-teaching intervention and explores students' experiences with this intervention through survey data. The findings suggest that engaging students in a team-teaching role, specifically a sequential equal-status team-teaching role incorporating interactive teaching styles, significantly enhances knowledge development, particularly among lower-performing students. Students reported a largely positive experience across all performance levels, attributing their growth to improved knowledge, teamwork, and communication skills provided by the intervention. The study recognizes the benefits derived from the team-based design of the intervention, such as enhanced social constructivist knowledge development. Overall, this study contributes to the existing body of knowledge on learning-by-teaching strategies. It emphasizes the potential of engaging students in a team-teaching role to enhance their academic performance and the development of key professional competencies.

Keywords: team teaching; knowledge development; teamwork skills; communication skills

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1. Introduction

The landscape of education is continually evolving with the incorporation of new teaching methodologies, the integration of advanced technology, and shifts in industry demands, all of which necessitate the re-evaluation and innovation of educational approaches. For instance, there is a growing emphasis on encouraging accounting educators to shift away from traditional rote learning practices and, instead, actively engage students in not only conceptualizing their accounting knowledge but also in developing the competencies required in the twenty-first-century workplace [1–3]. In the context of accounting education, 'competency' denotes the observable and measurable abilities of an accounting professional to integrate and apply their knowledge, skills, values, and judgments to achieve desired outcomes within specific business or financial contexts. This not only encompasses technical expertise but also essential soft skills, such as collaboration, communication, and ethical reasoning.

With the rise of automation affecting many functions in the accounting workplace [4–6], accounting education programs must pivot their focus. Instead of just teaching basic accounting skills that are easily automated, there is an increasing need to emphasize competencies, like human business acumen and communication skills [7,8]. Consequently, it is crucial for accounting students to cultivate competencies, like communication and teamwork [8,9].

Effective communication is particularly crucial for accountants, as the fundamental objective of accounting, in all its sub-domains, is to convey information that facilitates decision making by various stakeholders, including existing and potential investors, lenders, creditors, and employees [2]. Therefore, accounting students must become adept communicators, capable of elucidating financial reporting processes and concepts to stakeholders with diverse levels of familiarity or understanding of financial reporting information.

Another essential skill for the twenty-first-century workplace is teamwork [1,10]. The advent of the fourth industrial revolution and the proliferation of digital technologies in the accounting profession necessitate the development of teamwork skills. This equips accountants to collaborate effectively with other specialists on the outputs generated by automated processes [7].

Competency-based education has been advocated as an educational approach that enables the construction of knowledge and the development of other professional competencies [11,12]. Competency-based education entails providing holistic tasks that enable students to practice integrating the skills, knowledge, and attitudes needed to successfully engage with a professional task [11]. Team teaching, which is commonly defined as "two or more teachers collaborating on the planning, delivery, and /or evaluation of a course" [13–16], has been used in teacher education as an integrated task, offering benefits in teaching, collaboration, reflection, learning, self-confidence, and self-efficacy for student-teachers' professional development [13,17,18]. Thus, team teaching can be considered an example of a holistic task in a competency-based education program with both knowledge and competency development benefits [19,20]. For example, tasks involving team teaching, assigned to student teachers as part of their professional development, necessitate communication and teamwork among the students as they plan, deliver, and/or evaluate a course [21].

Social constructivism is a theoretical perspective that emphasizes the role of social interactions and culture in constructing knowledge [22]. It posits that learning is a socially mediated activity and that individuals construct new knowledge through interactions with others and their environment [22]. Rooted in this social constructivist perspective, team teaching emphasizes the inseparability of the individual from social influences and the crucial role of sociocultural contexts in teaching and learning [13,23]. This perspective suggests that interactions and dialogues engage individuals in the process of knowledge construction, enabling them to create meaning from new experiences [24–26]. As such, team teaching facilitates learning among student teachers by promoting the exchange of ideas, introducing alternative perspectives, providing advice, negotiating meaning, and leveraging each other's knowledge and skills [13,21]. This approach has been successfully used in teacher education, earning praise for its numerous benefits for professional development. These include emotional and professional support [27,28], personal growth [13], increased dialogue [29], the opportunity to learn from team members during teaching [17,18], and the reduction in feelings of isolation [30].

While team teaching has proven successful in integrating skills, knowledge, and attitude benefits within teacher education, its effectiveness for integrated knowledge and skills development in other fields has received little attention. Considering the similarities in the competencies, particularly communication and teamwork competencies, which accounting graduates need to develop and the competency development benefits of team teaching found in teacher education, team teaching as an integrated learning task for learning and competency development for accounting students is explored in this study.

2. Literature Review

2.1. Team Teaching

Team teaching is rooted in social constructivism [13,31]. Social constructivism suggests that integrating new concepts with existing knowledge and experience is enhanced by social interactions with others and engagements in authentic learning activities and tasks [24–26,32]. These social interactions often occur within an individual's community of engagement, such as their place of study or work. Consequently, from a social constructivist perspective, a person's knowledge is constructed and competencies are developed as they participate and contribute to community activities [22]. Through interactions with others, meaning is negotiated, and relationships are built toward a common purpose [22]. For example, team teachers learn from each other's knowledge and skills as they jointly

participate and engage in the activities of their teaching community [13]. In other words, members of a teaching team operate in each other's zone of proximal development [33].

The 'zone of proximal development' concept, initially proposed by psychologist Lev Vygotsky, represents the difference between what learners can do without help and what they can achieve with guidance and encouragement from a skilled partner [34,35]. Therefore, interactions within this zone support a person's construction of knowledge and skill development toward what would be considered a socially agreeable interpretation of that knowledge or skill [36]. For instance, student teachers who are learning to become professional teachers benefit at both a professional (teaching competencies) and personal (e.g., self-confidence) level by working within their own zone of proximal development as they team teach alongside more experienced teachers [37–39].

Student teachers who engage in team teaching with other teachers in their teaching community have also shown benefits in terms of growth competence, adaptive expertise, and collaborative expertise [40]. Growth competence is akin to learning how to learn from one's own teaching through a process of self-reflection. At the same time, adaptive expertise relates to a teacher's ability to adapt their teaching in response to student cues and contextual demands [40]. The development of collaborative expertise includes the ability of student teachers to share their expertise, recognize their co-responsibility for student learning, and become active agents in their own development [40]. The level of collaboration between teaching partners varies according to the five models of team teaching [13]. Table 1 provides an overview of the five models and the level of collaboration per model [41].

Table 1. Team-teaching models.

	Model	**Role Partner 1**	**Role Partner 2**
Low level of collaboration	1. Observation model	Full responsibility teacher	Observer
↓	2. Coaching model	Full responsibility teacher	Coach
	3. Assistant teaching model	Main responsibility teacher	Assistant
	4. Equal-status model	Identical status and responsibility	
High level of collaboration	5. Teaming model	Full collaboration in the planning, delivery, and evaluation of the lesson	

Among these models, the equal-status model is particularly relevant for this study, as this model facilitates an environment in which both teachers actively contribute to the teaching process and share equal responsibility for the learning outcomes. As a result, teachers engaged in the equal-status model are more likely to engage in meaningful dialogue, share their expertise, and learn from one another, thus enhancing their own professional development and the quality of instruction delivered to the students. Furthermore, the equal-status model, with its parallel, sequential, and station teaching designs [41], offers a flexible framework that can be adapted to various teaching contexts and content areas, making it a suitable choice for exploring the knowledge and competency development benefits of students engaged in learning-by-team teaching.

The parallel design of the equal-status model divides the class into subgroups and requires each team teacher to teach the same learning content or activity to a subgroup of students. The sequential design divides learning content or activities between the team teachers, with each teacher responsible for a different lesson phase. Lastly, the station design splits the class into subgroups and also splits the learning content, with each teacher teaching specific content to a subgroup of students.

Within the five team-teaching models, it is also crucial to consider the different styles of team teaching that can be employed. These three basic team-teaching styles [42,43] are:

(1) Participant–observer: in this style, both teachers are present for all the classes; however, one teacher primarily leads the instruction while the other observes. The observer

may provide support, assistance, or supplementary instruction as needed, but does not lead the instruction independently.

(2) Interactive: in the interactive style, both teachers are present and actively collaborate in teaching, instructing, and engaging with students in the discussion. They share responsibility for planning, delivering, and assessing student learning.

(3) Rotational: in the rotational style, each teacher is responsible for teaching different parts of the course and is only present when it is their turn to teach. This approach allows for the specialization and efficient use of each teacher's expertise.

Table 2 presents a mapping of the team-teaching styles that can be applied within each team-teaching model, illustrating the versatility and adaptability of these approaches to various educational settings and objectives.

Table 2. Mapping of team-teaching styles across team-teaching models.

Team-Teaching Model	Team-Teaching Style
1. Observation model	Participant–observer Rotational
2. Coaching model	Participant–observer
3. Assistant teaching model	Participant–observer Rotational Interactive
4. Equal-status model	Participant–observer Rotational
5. Teaming model	Interactive

Students who are exposed to team teaching in their classroom environment reap various benefits from their teachers' collaborative efforts. These benefits include learning beyond mere knowledge accumulation [44], increased classroom engagement [45], increased timely feedback [46], and a richer learning experience resulting from exposure to multiple teaching styles and diverse perspectives on course material [47–49]. While the research has demonstrated professional development benefits for student teachers from team teaching [13] and learning benefits for students who are exposed to team teaching by their teachers [36,44,47,49], little is known about the potential knowledge and competency development benefits for students from other disciplines who engage in the role of team teacher as part of their learning process [50]. By examining students' experiences from different disciplines who engage in team teaching, researchers can better understand the underlying mechanisms that drive any resultant knowledge and competency development.

When assessing the benefits of team teaching in other disciplines, it is also essential to acknowledge the disadvantages experienced by student teachers who engage in the role of team teacher. Acknowledging these disadvantages and being aware of their potential impact in other disciplines provides a more balanced view of its use. Some disadvantages of engaging in the role of team teacher noted by student teachers include a lack of compatibility with peers, comparison between peers, difficulties experienced between team teachers when providing constructive feedback, increased workload, and less practice in individual teaching [13]. These disadvantages should be carefully considered when involving students in team-teaching roles across different disciplines to mitigate their impacts.

2.2. Learning by Teaching

The current literature on the learning-by-teaching approach primarily focuses on students' self-generating explanations to themselves [51–53], their peers, or an unknown or fictitious other through video or written explanations [54–56]. This literature indicates that learning by teaching is a powerful instructional approach [57–59]. Explaining to oneself is a self-orientated activity, while explanations to peers or an unknown or fictitious other require the explainer to consider the other's perspectives in creating an explanation [60]. Consequently, the act of explaining to others leads to deeper and more durable learning

than control activities, like restudying and summarizing [54,61,62]. From a cognitive perspective, explaining to others promotes generative learning [63]. It encourages students to make sense of their learning material while organizing and integrating new ideas with their existing knowledge [64].

Explanations to others can also be presented orally. The research findings indicate that although written explanations are more organized, oral explanations, like video explanations, result in better learning and are more elaborative and comprehensive [58,65]. Oral explanations also tend to include more audience-directed utterances (first- and second-person pronouns), which indicates higher levels of social presence in oral explanations [54,58].

While abundant research details the effects of diverse explanation delivery methods, whether to oneself or others, and through oral, video, or written modes, on knowledge development, the prevailing literature on the learning-by-teaching method predominantly addresses the advantages students gain as individual teachers rather than as members of a teaching team [66]. Although Duran and Topping introduced a learning-by-teaching model in 2017 where students co-taught alongside their instructors [67], scant attention has been given to the concept of students engaging in co-teaching or team teaching as a learning strategy [50]. Consequently, there is a noticeable gap in understanding the benefits and processes when students engage in team teaching as part of their learning process. To address this, this study aims to investigate the use of team teaching among accounting students as part of their learning process. The decision to focus on accounting students stems firstly from the discipline's emphasis on the need to develop both theoretical knowledge and practical competencies, and secondly from the overlap of the ability of team teaching to develop communication and teamwork competencies and the need for these to be developed by accounting students.

The insights achieved from investigating the knowledge and competency development benefits for students, who co-plan and co-deliver an explanation of their course content in the role of team teachers, can have significant implications for curriculum design and instructional strategies, not only in accounting education but also in the broader context of higher education. This leads to the following research questions:

RQ1: How does the team-teaching of course content impact students' conceptual knowledge of accounting content?

RQ2: What are the experiences of accounting students in terms of knowledge and competency development when team-teaching course content?

By addressing these research questions, this study aims to contribute to the growing body of research examining the role of team teaching in facilitating learning by teaching within the context of a higher education course where students are required to team teach as part of their learning process. Specifically, this study explores the effects of team teaching on accounting student knowledge and competency development. Through this, the study hopes to provide greater insights into the learning-by-team-teaching process and how it can be harnessed to enhance higher education instruction and learning.

3. Materials and Methods

This study evaluated the efficacy of engaging students in the role of team teacher to support their conceptual knowledge of an accounting topic while simultaneously facilitating the development of their communication and teamwork competencies. Specifically, third-year students from an undergraduate business degree program focusing on International Financial Reporting Standards were tasked with collaboratively creating an oral recording or podcast in which they explained the preparation of consolidated financial statements to a peer who could not attend the class. A copy of the complete instructions to the students is available at https://bit.ly/3A7irdD (Accessed on 3 November 2023).

This task aligned with the course learning objectives by requiring students to thoroughly understand the preparation of consolidated financial statements, a key concept in International Financial Reporting Standards, and to articulate this understanding to their peers. Additionally, by working collaboratively, students develop their communication and

teamwork competencies, which are essential skills for success in the accounting profession. This approach was consistent with the broader pedagogical goals of the course, which emphasized active learning, peer teaching, and the development of practical skills.

3.1. The Application of an Equal-Status Team-Teaching Model in This Study's Learning-by-Team-Teaching Intervention

This study's learn-by-team-teaching intervention was anchored in the equal-status team-teaching model. This model is predominantly utilized for the paired field placement of student teachers [13], and it has garnered positive feedback from many student teachers [68]. Notably, student teachers appreciate the model for its non-intimidating, enjoyable experience and for its contributions to their professional development [68]. At its core, this model requires all teaching team members to share an equal status and responsibility in the teaching process [37]. The subsequent sections discuss how both aspects were applied in this study.

3.2. Equal Status

In the context of this study, students assumed the role of team teachers. They were grouped into teams of five or six, tasked with collaboratively preparing and presenting an accounting topic to a fictitious other student who missed prior classes on the topic. Every member took on the role of a team teacher as they worked together to prepare and present their team's explanation to the fictitious other student. Every member played a pivotal role, aligning with Thousand, Villa, and Nevin's (2006) assertion that team teaching can involve multiple educators sharing teaching responsibilities [69]. Consequently, the students collaboratively participated in two main phases: an explanation planning phase and an explanation delivery phase. The equal-status model allowed for the incorporation of varying elements of the three team-teaching styles across these phases. While the planning phase necessitated a close collaboration, with each team member being required to be present and contribute equally, the delivery phase granted flexibility. The delivery phase did not explicitly require all team members to be present, and the team-teaching style for the delivery phase was not pre-determined. This allowed students the flexibility to include their entire team in this phase (interactive) or to have only some present. The flexibility allowed in this phase accommodated independent work (participant–observer) or, on occasions where expert knowledge was required, could allow stronger team members to present parts of the team's explanation (rotational).

3.3. Shared Responsibility

Team teaching inherently underscores collaboration and shared responsibility. In this teaching approach, teaching responsibility transitions from an individual to a collective focus, ensuring that the entire team takes responsibility for their students' learning outcomes [70,71]. In the context of this study, the emphasis was on learning rather than teaching. The student teams were responsible for preparing and presenting an accounting topic, with their performance contributing to their final course grade. This approach suggests that students might perceive their grades as a reflection of their shared responsibility.

The facilitation of shared responsibility in this study was anchored in the grading protocols for the intervention. The equal-status model did not just demand shared responsibility, but an equitable distribution of the same. Recognizing the potential risks of unequal participation (free riding) in collaborative learning tasks, grading was implemented at both team and individual levels [72]. The final student grade constituted a team grade (reflecting the quality of the explanation) and an individual grade (based on peer-reviewed team member effectiveness), each carrying a 50% weight. The latter employed criteria from the Comprehensive Assessment of Team Member Effectiveness (CATME) instrument [73], which focused on elements, such as contributing to the team's work, interacting with teammates, team-progress monitoring, quality expectations, and possessing relevant knowledge and skills.

3.4. Allocation to Teacher Teams

The team allocation process aimed to create heterogeneous teams of a maximum of six students each to help mitigate the risk of peer comparisons [74]. To facilitate this, students were first grouped into six clusters based on their previous accounting course grades, ranging from a cluster of the strongest students to a cluster of the weakest students. All students with grades above 65% were included in the first cluster, all students with grades between 65% and 60% in another, and so on. Once the clusters were formed, a random number was allocated to each student within each cluster using the random number function in Microsoft Excel. Students within the clusters were then listed in ascending order according to their random numbers. Teams were then formed by allocating one student from each cluster to a team using a top-down approach. This ensured that each team comprised a mix of academically stronger and weaker students, promoting the creation of heterogeneous teams [74]. Most teams included 6 students, though a few had 5, resulting in 26 teams. Students without a prior year mark comparable to the rest of the sample were grouped into separate teams and were not considered in the results of this study.

3.5. Consideration of the Disadvantages of Team Teaching as Identified by Student Teachers

When assigning accounting students the role of team teacher, as they were allocated to teams who would collaboratively prepare and present a team explanation, the following considerations were made in light of the disadvantages noted by student teachers who participated in team teaching.

- Lack of compatibility between peers: accounting education research has identified various challenges associated with teamwork, including the emergence of conflicts between team members due to free riders, a lack of clear leadership, inter-group rivalry, failure to rapidly recognize group problems, and lack of direction during problem-solving tasks [72]. Several authors who examined these challenges in the context of accounting education suggested that evaluations at both individual and group levels may mitigate the eroding effects of team conflicts on the benefits of learning in teams [72]. Therefore, the design of this study incorporated both an individual- and group-level grade as part of the process of engaging the students in a team-teaching role.
- Peer comparisons: peer comparisons may be interpreted as an impact of status differences. Accounting education research suggests that a course instructor should form heterogeneous groups of around four to six students to help mitigate this risk [74]. It is also beneficial to ensure opportunities within the group that allow low-ability students to learn from medium-ability students rather than being paired only with students of the highest ability [74]. This was considered in the formation of the teacher teams for this study, as the teams included both academically stronger and weaker students.
- Difficulties in providing constructive feedback: it was observed that accounting students felt confident in their ability to provide constructive feedback during collaborative learning tasks [75]. However, despite this confidence, it may still be beneficial to consider suggestions from other fields of study. These suggest training students on providing constructive feedback and creating an institutional culture of safety around feedback [76]. While this study did not specifically control for this disadvantage, it evaluated student feedback on their experiences of engaging in the role of a team teacher. This was performed to determine if students mention the difficulty of providing constructive feedback as a disadvantage in an accounting education context.
- Increased workload disadvantages: this refers to the time-intensive work required to collaboratively prepare, plan, and reflect with a peer [13]. The increased time requirements were mainly due to increased peer dialogue [13]. While increased dialogue is beneficial from a social constructivist learning perspective, assessing the benefits of team-teaching tasks for accounting students may be necessary concerning the extra time such tasks may require. This was evaluated as part of the students' survey feedback on engaging in the role of a team teacher.

3.6. The Use of Podcasts

Utilizing podcasts as a delivery method is inspired by the learning-by-teaching literature. Previous research in this field has examined individually prepared student explanations to a fictitious other delivered in various formats, whether orally, via video, or written. Such interventions have consistently demonstrated benefits for students in terms of conceptual knowledge enhancement [54,65,66].

Podcasts stand out for their flexibility and accessibility. These qualities make them particularly useful in large-group educational settings, where implementing traditional team-teaching methods can pose logistical challenges. Additionally, the widespread availability of smart devices, which most students own and can easily record audio with, facilitates this approach [77]. Recent studies have shown that audio explanations yield learning outcomes comparable to those from video explanations. The latter is already established as beneficial for both conceptual and transfer knowledge growth [58]. Furthermore, compared to written formats, oral explanations typically exhibit greater depth, as they are more elaborative and comprehensive, promoting deeper learning [58,65].

Given this context, the choice of using podcasts for delivering team explanations in this study aligned with the sequential design of the equal-status team-teaching model. Since podcasts inherently allow for only one speaker at a time, each team member would sequentially contribute to the overall team's explanation. The division means each team member would naturally oversee a distinct phase of the team explanation. It is worth noting that the sequential design was identified as a preferred approach among the student teachers. They perceived it as offering greater opportunities for collaboration, professional development, personal growth, and a more manageable workload [68]. Furthermore, the increased collaboration potential in the sequential design complemented the objective of fostering teamwork skills among accounting students.

3.7. Accounting Topic Selection: Preparation of Consolidated Financial Statements

The consolidation topic of the intervention was chosen because the course's instructors identified the topic as challenging for the students. In explaining the preparation of consolidated financial statements, the students were instructed to explain how the revaluation of the equipment (at acquisition) and the accumulated loss of the subsidiary (at acquisition) should be treated in preparing the analyses of the owners' equity of the subsidiary. These instructions required the student teams to express their domain knowledge of the preparation of consolidated financial statements as they explained the principles of the revaluation of equipment and accumulated losses of a subsidiary and how this affected the preparation of the analysis of owners' equity that was prepared as part of the process of preparing the consolidated financial statements of a group of companies. The instructions were thus designed to provide the students with an opportunity to explain their conceptual knowledge of the topic.

3.8. Measurement of Knowledge Development (RQ1)

To measure the knowledge development benefits of learning by team teaching (RQ1), the students' pre-and post-test scores for assessments that measured their conceptual knowledge before and after the intervention were compared. Before the students were required to prepare their team explanations, they were asked to study for an assessment designed to test their individual knowledge of preparing consolidated financial statements. This assessment served as the pre-test for the study. Following the completion of the pre-test, the learning-by-team-teaching intervention was announced. After submitting their team explanations, the students completed an unannounced post-test. The post-test remained largely unchanged from the pre-test; however, to avoid memory effects, certain elements were altered, such as the businesses' names, the amounts, and the 'arrears period' for unpaid preference dividends. The solution to the pre-test was provided to the students only after the post-test. A copy of the pre-test and post-test are available at https://bit.ly/3KNAhqP (accessed on 3 November 2023).

A subject-matter expert evaluated both tests to ensure the pre- and post-test validities. Another subject-matter expert, who was blind to this study, marked the answers to both the pre- and post-tests. This approach helped maintain the integrity of the assessment process and provided a fair evaluation of the students' knowledge development throughout the learning-by-team-teaching intervention.

Paired-sample *t*-tests, performed using SPSS version 21, were utilized to analyze students' knowledge differences before and after completing their team explanations. A box plot analysis was employed to identify any potential outliers that may have had a confounding effect on the results for RQ1. In addition to evaluating the overall impact of the intervention, the analysis also considered whether the intervention had differential knowledge benefits for students with varying prior academic performances. This consideration was important as collaboration could lead to different learning outcomes for students with differing academic performances [78–80]. The intervention occurred during the second semester, coinciding with the presentation of the topic in the course and following approval from the institutional review board. The study adhered to the principles of the Declaration of Helsinki and received ethical approval from the University's Institutional Review Board (protocol code EMS106/19, approved on 6 June 2019).

3.9. Measurement of Student Experience (RQ2)

A survey approach was employed to address the second research question (RQ2) on students' experiences of the learning-by-team-teaching intervention. The survey consisted of mainly open-ended questions for qualitative insights and a 7-point Likert scale (1: extremely negative to 7: extremely positive) question, which provided quantitative data regarding the students' overall experiences of the intervention. The questions were adapted verbatim from previous studies on collaborative assessment tasks [81,82], with modifications to suit the context of this study's team-teaching task. This approach aimed to capture students' experiences and perspectives on competency development during the intervention.

To ensure content validity, two accounting education experts reviewed the survey instrument [83]. They assessed the alignment of the items with the intended construct and suggested modifications for clarity. Minimal changes were performed based on their recommendations. The final survey questions are presented in Table 3.

Table 3. Survey instrument questions.

• Tell us about your experience of the collaborative preparation of your team's explanation—how was it for you? (Describe the process from start to finish and how it felt—what was going on for you/others, what worked or did not work for you?).
• How did you experience collaboratively preparing a team explanation as a form of assessment, in comparison to the "requirements" of a traditional financial reporting assessment/assignment?
• What do you ALL think the collaborative preparation of your team's explanation as a form of assessment was actually assessing?
• On a scale of 1 (extremely negative) to 7 (extremely positive), rate your overall experience of the collaborative preparation of your team's explanation to a fictitious other student who could not attend the contact sessions.
• If you designed this assessment that required you to collaboratively prepare an explanation, what would you do differently and why?
• Were you one of the team members who spoke for the oral recording (i.e., did your voice appear in the oral recording)?
• Is there anything we should have asked you about in your reflection on the collaborative preparation of your team's explanation but have not?
• Why would you, or why would you not, want to be assessed again in this manner?
• Is there anything further that comes to mind in your reflection that you would like to add?

While the survey predominantly consisted of open-ended questions for detailed feedback, one specific question (the fourth question in Table 3) utilized a 7-point Likert scale (1—extremely negative to 7—extremely positive). This bipolar continuum, recommended for optimally capturing positive or negative attitudes [84], included appropriate verbal labels for each option (e.g., strongly agree or agree) to ensure clarity [85] and maintain

visual balance to avoid respondent confusion [86]. Using open-ended questions allowed students to articulate their experiences comprehensively, facilitating the comparison of responses in this study with the findings from teacher education research.

The survey instrument was administered online through Google Forms, and the link to the form was shared via the learning management system (LMS) following approval from the institutional review board. To maximize the response rate [87], students were pre-notified about the survey's availability, and reminders were sent to encourage participation. The quantitative data collected from the survey were analyzed using SPSS version 21. An initial data integrity check was conducted and descriptive statistics were calculated. In analyzing the responses from an ordinal Likert scale response, reporting means and standard deviations were not considered suitable as their meanings were unclear [88,89]. The median of the responses to close-ended questions was considered to provide a more useful representation of the data [89]. Therefore, the median was used as the primary measure of central tendency for the ordinal scale data obtained from the Likert scale question in the survey instrument [88,89].

The qualitative data from the survey instrument were analyzed through a content analysis, with themes identified from the students' reflections [81]. Basic themes were developed and coded (coded responses were scrutinized at a later point in time and any inconsistencies between the initial and subsequent analyses were resolved) using NVivo 12, which facilitated in understanding the students' experiences and perspectives on the learning-by-team-teaching intervention and its potential impacts on their knowledge and competency development. The qualitative analysis also provided an opportunity to achieve insights into aspects of the learning-by-team-teaching intervention that may have needed improvements to enhance its effectiveness.

3.10. Participants

The final sample for analyzing the effects of the learning-by-team-teaching intervention on students' knowledge (RQ1) totaled 119 students. This number was achieved after removing students who did not provide consent for their data to be analyzed (n = 21), did not complete the pre-test (n = 6) or post-test (n = 7), transferred from another degree or university (n = 6), and after removing outliers identified the following boxplot analysis (n = 5). The sample size for RQ1 exceeded the required sample size of 27 as determined by the a priori power analysis for paired-sample t-tests (GPower, Version 3.1.9.7). Power was set to 0.80, α-error to 0.05, and the medium effect size to 0.5. The effect size was determined with reference to the average effect size of learning-by-teaching interventions that required preparing-to-teach and teaching as part of the learning process [90].

For RQ2, 113 students (71%) responded to the survey instrument. A test for non-response bias was performed. The prior performance data of all students registered for the course from which the survey sample of students originated were available. A chi-squared test was performed on the student's prior performance levels (low, moderate, and top performers) to identify if the sample was representative of the total student population enrolled in the course. No indication of a response bias was identified as there was no significant difference between the sample and total student population ($X2(2) = 1.40$, $p = 0.50$). The sample size of students used for this study's exploration of the use of a learning-by-team-teaching intervention was in line with the sample sizes of prior research that assessed the benefits of learning-by-teaching interventions [66]

4. Results

The results unfold in two parts. The first part analyzes the learning-by-team-teaching intervention's effect on students' knowledge (RQ1). The second part explores students' experiences of the intervention for knowledge and competency development based on the results from the survey instrument (RQ2).

4.1. Knowledge Benefits of the Learning-by-Team-Teaching Intervention (RQ1)

The mean pre-test score of 62.61% significantly increased to a mean post-test score of 65.65% (t = 2.53, p = 0.006, d = 0.24) (Table 4). The increase suggests that the learning-by-team-teaching intervention assists the students in improving their knowledge of the course content.

Table 4. Students' pre- and post-test knowledge (n = 114).

	Minimum	Maximum	Mean	Std. Dev
Pre-test percentage	21.62	100.00	62.61	17.19
Post-test percentage	18.91	100.00	65.65	17.34

To better understand this preliminary observation, the entire sample of students was classified into three performance categories based on their pre-test scores: low, moderate, and top performers. These categories corresponded to students who scored at the 33rd, 66th, and 100th percentiles, respectively. This division was selected to evenly distribute the sample for a more nuanced analysis. Specifically, students at or below the 33rd percentile were classified as low performers, those between the 33rd and 66th percentiles as moderate performers, and those above the 66th percentile as top performers. It is essential to acknowledge that this method of categorization was just one of several possible methods, and it was chosen because it provided a balanced representation of the data distribution.

The mean pre-test scores of both low (8.11% change, t = 3.88, p < 0.001, d = 0.65)- and moderate-performing students (5.33% change, t = 2.46, p = 0.010, d = 0.41) revealed a significant increase in the post-test results (Table 5). Conversely, the top performers' mean pre-test scores decreased significantly by 3.28% in the post-test (t = −2.06, p = 0.023, d = 0.32). These results suggest that the learning-by-team-teaching intervention benefits the lower-performing students the most. Differential learning benefits for lower- or higher-performing students are commonly identified in team-based learning settings [78–80]. The differential knowledge development benefits may also be attributed to the students not having the opportunity, beyond that of participating in the intervention, to restudy for the post-test. Consequently, some knowledge degradation, particularly for top-performing students participating in the intervention, may have occurred because of the passing of time and the associated spacing effects on learning between the pre-test and post-test [91].

Table 5. Change in knowledge per prior performance category.

	Low performers (n = 36)		Moderate Performers (n = 36)		Top Performers (n = 42)	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Pre-test %	42.49	8.89	62.31	3.09	80.12	8.33
Post-test %	50.60	12.97	67.64	14.14	76.83	13.54
Change %	8.11	12.51	5.33	13.03	−3.28	10.31

The increased standard deviation in the post-test percentages compared to the pre-test percentages (Table 5) signifies that the learning-by-team-teaching intervention may have varying effects on different students. This variance might be linked to whether a student was involved in the presentation during the delivery phase of the learning-by-team-teaching intervention. Consequently, the change in knowledge for presenters (n = 48) and non-presenters (n = 51) was explored (Table 6). The sample size for the analysis, which assessed the variation in knowledge based on presenter status, was reduced by 15. This reduction was necessitated because, out of the initial 114 students sampled for Research Question 1 (RQ1), 15 students did not complete the survey. In this survey, students were asked to indicate whether they presented their team's explanation in the audio recording. Therefore, the sample size for this analysis stands at 99. Pre-test scores for the presenters and non-presenters did not demonstrate a significant difference (t = 1.05,

p = 0.148, d = 0.21). However, the presenters' knowledge changed (increased) by 4.05%, while the non-presenters increased by 1.01%. While the change in knowledge between the presenters and non-presenters was not significantly different (t = 1.17, p = 0.123, d = 0.235), it is worth noting that there was an improvement that could have tangible real-world implications. Even a 3% increase in understanding can have valuable academic effects for individual students. In practical terms, this improvement might translate into a more solid comprehension of coursework, leading to a better academic performance over time.

Table 6. Change in knowledge for presenters and non-presenters.

	Presenters (n = 48)		**Non-Presenters (n = 51)**	
	Mean	**Std. Dev**	**Mean**	**Std. Dev**
Pre-test %	61.93	17.20	65.55	17.01
Post-test %	65.99	17.52	66.56	16.08
Change %	4.05	14.23	1.01	11.69

Upon further inspection, no significant difference in the change in knowledge between presenters and non-presenters was identified for any of the prior performance categories (Table 7). This suggests that the knowledge benefits of the learning-by-team-teaching intervention are not influenced by presenter status.

Table 7. Change in knowledge for presenters and non-presenters per prior performance category.

Panel A: Low performers				
	Presenters (n =17)		Non-Presenters (n = 11)	
	Mean	Std. Dev	Mean	Std. Dev
Pre-test %	43.72	8.61	41.03	10.31
Post-test %	53.74	15.11	47.91	10.54
Change %	10.02	15.81	6.88	10.84
Panel B: Moderate performers				
	Presenters (n =13)		Non-Presenters (n = 19)	
	Mean	Std. Dev	Mean	Std. Dev
Pre-test %	61.54	3.68	62.45	2.53
Post-test %	67.15	15.91	66.71	13.18
Change %	5.61	15.31	4.26	12.00
Panel C: Top performers				
	Presenters (n =18)		Non-Presenters (n = 21)	
	Mean	Std. Dev	Mean	Std. Dev
Pre-test %	79.43	9.09	81.21	8.21
Post-test %	76.73	13.50	76.19	12.11
Change %	−2.70	8.54	−5.02	9.30

In summary, the findings for RQ1 suggest that the learning-by-team-teaching intervention is beneficial for the knowledge development of low and moderate performers. Although the top performers may not have obtained knowledge benefits, they may still have benefited from the team-teaching intervention in terms of competency development. The subsequent analysis of students' survey responses regarding their experiences of the learning-by-team-teaching intervention may provide further insights.

4.2. Students' Experiences of the Learning-by-Team-Teaching Intervention (RQ2)

The vast majority of the respondent students (86%; n = 99) were positive about the learning-by-team-teaching intervention, rating their overall experience as at least four out of seven (median = 6) (Table 8). Students praised the intervention as "*very useful*" and remarked that they "*took a lot from this project*". They believed it would "*help [them] to pass the course*," attributing this optimism to the intervention's diverse learning opportunities.

In particular, they noted that the intervention was "*a clever way of making sure students not only learn the application but understand why and how things are done*". Numerous students highlighted the generative learning benefits [57,92] afforded by the learning-by-team-teaching intervention, describing it as a different or unique approach. "*This is a way different angle. Instead of just calculating traditional required questions, I had to think what is the easiest and understandable way to explain the required*".

Table 8. Students' experiences of the team-teaching initiative.

Quantitative Survey Questions		
On a Scale of 1 (Extremely Negative) to 7 (Extremely Positive), Rate Your Overall Experience of the Collaborative Preparation of Your Team's Explanation to a Fictitious Other Student Who Could Not Attend the Contact Sessions	***M* = 5.70 (SD = 1.13)/ Median = 6.00**	
	Total (*n* = 113)	
	n	**%**
7 Extremely positive	30	26.55
6	41	36.28
5	26	23.01
4	12	10.62
3	2	1.77
2	2	1.77
1 Extremely negative	0	0.00

Many students reported that a collaboration with their teammates significantly enhanced their learning. They noted, "*Talking to [their] group members gave [them] deeper insight into certain topics because [they] all had different ways of interpreting the information and different ways of explaining it.*" They further commented, "*[M]any concepts started making sense after we engaged [with each other] about them.*" Students also appreciated the process of the scaffolding. One student shared, "*It helped me understand the work better by explaining it to someone else.*" The diverse range of interpretations within the team was also valued. "*I received a lot of different versions of how people understood consolidations, and this made me aware of how differently people grasp the concept of consolidations, and this gave rise to me either helping people understand the concept of consolidations or learning new things about consolidations.*"

Students also acknowledged the learning-by-team-teaching intervention as a significant avenue for developing various competencies. They primarily reported improved teamwork skills, but also highlighted a broad range of other generic skills fostered through the intervention. These skills align with the competency areas for generic skills as prescribed in the Revised International Education Standard (IES 3), Initial Professional Development—Professional Skills:

- Intellectual skills: problem-solving, thinking, and analytical skills.
- Interpersonal and communication skills: communication, the ability to explain, the ability to listen, and interpretation skills.
- Personal and organizational skills: resilience, time management, leadership, creativity, organization, and responsibility.

Despite the overwhelmingly positive feedback, a few challenges were identified with the learning-by-team-teaching intervention. A small number of students raised concerns about non-participation by specific team members, mainly due to potential free riding effects inherent in team-based activities. This concern was, however, pre-empted by the inclusion of both the individual- and team-level grading of the intervention. Some students suggested increasing the five-minute limit for the explanation and extending the overall time allocated for completing the project. The opportunity to select their team members and to have a wider choice of topics and explanation formats also emerged among their suggestions.

Given that the data for RQ1 revealed varying levels of knowledge benefits among low-, moderate-, and high-performing students, a regression analysis (the dependent variable

for the regression was students' rating of their overall experience of the intervention. The two independent variables were dummy variables for top performers (1 = top performer, 0 = otherwise) and moderate performers (1 = moderate performer, 0 = otherwise)) was performed to examine potential disparities in students' perceptions of the benefits of the intervention across these performance categories. Three students who participated in the survey, but did not participate in the pre-test, were excluded from this analysis, as they could not be classified into a prior performance category. The regression results, which were not tabulated, revealed that the average overall experience of both the top ($t = -0.87$, $p = 0.388$)- and moderate ($t = 1.52$, $p = 0.131$) performing students did not significantly differ from the overall experience of the low-performing students. This non-significant result is noteworthy, suggesting that, regardless of the differential effects on knowledge gain, all performance groups perceive the learning-by-team-teaching intervention as equally beneficial. It indicates that the intervention potentially offers competency development advantages regardless of the student's performance level. To further examine this, a comparison of the most frequently mentioned competencies was conducted per prior performance category (Table 9).

Table 9. Percentage of students from each prior performance category who indicated that the intervention promoted the assessment of competency development.

Most Frequently Mentioned Competencies	Top Performers (n = 43)	Moderate Performers (n = 39)	Low Performers (n = 28)
Interpersonal and communication skills: teamwork	72%	54%	61%
Interpersonal and communication skills: communication	37%	33%	18%

Table 9 reveals that top performers are particularly convinced that the learning-by-team-teaching intervention enhances teamwork skill development. Moderate and low performers also have strong beliefs about the intervention's capacity to boost teamwork skills, with 54% of moderate performers and 61% of low performers indicating that the intervention fosters their teamwork abilities. Additionally, roughly a third of the students classified as top (37%) and moderate (33%) performers believe that the intervention advances their communication skill development.

5. Discussion

This study aimed for a better understanding of team-teaching benefits outside of teacher education and to explore the use of a learn-by-team-teaching intervention as a means to broaden competency development to allow for both knowledge and communication and teamwork competency development among students in disciplines outside of teacher education. This study focused on the knowledge and competency development of students who, as members of a teacher team consisting of five or six individuals, co-planned and co-delivered an explanation of their course content via a podcast to a fictitious peer in the role of team teachers.

The first research question (RQ1) investigated how the team teaching of course content impacted students' knowledge of accounting coursework. The literature review highlighted that team teaching, rooted in social constructivism, enhanced learning through social interactions and engagements in authentic activities [13,31,93]. Through team teaching, student teachers operate within each other's zone of proximal development, learning from each other's knowledge and skills [13,33]. The findings of this study reinforce these principles, indicating that accounting students collaboratively construct their understanding of accounting concepts when they engage in team teaching, thereby facilitating their knowledge development. The act of explaining to others prompts students to organize and integrate new ideas with their existing knowledge, enhancing their understanding of the learning material [63,64]. In finding knowledge development benefits for accounting students who engage in a team-teaching task, this paper can add to the current understanding of the

learning benefits of team teaching as it provides evidence of such benefits outside of teacher education. Secondly, the knowledge development findings of this paper expand on the current team-teaching literature as it provides evidence of differential learning benefits from team-teaching tasks for students with different prior performance levels. This could potentially indicate that weaker students, even inside teacher education, may achieve more in terms of their knowledge from team-teaching tasks than higher-performing students. This should be investigated further.

The second research question (RQ2) explored students' experiences of knowledge and competency development when team teaching. Consistent with the findings from previous literature on teacher education, the students universally reported a growth in competence, adaptive expertise, and collaborative expertise [37,40]. Notably, team teaching stimulated a fresh perspective among students on their coursework. This team-based design facilitated social constructive knowledge development. A prominent highlight from the feedback was the universal recognition across all students, irrespective of their prior academic standings, of the intervention's pivotal role in honing competencies, such as intellectual, interpersonal and communication, personal, and organizational skills.

Shedding light on the survey's outcomes (RQ2), it is evident that the advantages and pitfalls of team teaching as experienced by accounting students largely mirror the findings from student teachers involved in team teaching during their professional development.

Most Frequently Noted Benefits:

- Collaborative learning benefits [17,18,68]—the accounting students consistently emphasized the knowledge construction benefits afforded by the collaborative nature of the team-teaching intervention.
- Support for Professional Development [27,68]—a significant number of accounting students pinpointed the potential of the intervention in developing critical professional competencies, such as intellectual, interpersonal and communication skills, and organizational skills, aligning with the Revised International Education Standard (IES 3) [94]. The most frequently mentioned competencies the students mentioned were interpersonal and communication skills.

Additional Benefits

- Increased dialogue [29]—a shared sentiment among some accounting students and student teachers was the learning benefits from discussions with their peers. This dialogue granted a variety of insights into the topic, assisting in effective scaffolding. The dual benefits of both receiving and providing explanations among peers were recurrently underscored.
- Personal growth benefits [68,95]—a segment of students recognized opportunities for honing resilience, time management, leadership, and organization skills.

Commonly Identified Disadvantages

- Peer compatibility issues [68]—evidently, a recurrent challenge was the non-participation of team members, prompting suggestions for the self-selection of team members.
- Increased workload [68]—an often-mentioned feedback was the extended time needed for the intervention, with students proposing an extended timeframe for the entire intervention.

A novel insight that this study provided was the consistent observation across the board that the benefits from team-teaching intervention extended to all students, irrespective of their past academic performances. Collectively, while the study provides preliminary evidence of the potential of team teaching in refining both technical knowledge and competencies, it also confirms that educators need to balance the benefits and disadvantages when deciding to implement the intervention and when designing it.

In terms of educational practice, this study urges higher education stakeholders, particularly in disciplines balancing theoretical knowledge and practical competencies, to

consider team teaching as a learning intervention. The practical educational considerations that educators need to be aware of when implementing such interventions include:

- Managing peer incompatibilities. Educators implementing learning-by-team-teaching interventions should proactively mitigate learning impediments caused by peer incompatibility. Allowing students to choose their teams may be one option, but the associated disadvantages of student learning must be carefully considered. Previous research on teacher education suggests promoting strong student relationships early in the team placement stage and encouraging communication between team members throughout the intervention [21,68].
- Organizational support and time management. Providing organizational support is crucial for the success of a team-teaching intervention. Educators can support students by aligning the intervention with less busy periods in their academic calendars and allocating time for team meetings [21].

Careful planning, execution, and educator training are crucial for the success of any team-teaching intervention. Educational institutions should consider providing training to teachers who wish to implement such interventions. This training should equip them with the skills needed to guide their students in effective communication and collaboration, which are critical to the success of the intervention [21].

6. Conclusions

This study set out to examine the role of team teaching in promoting knowledge and competency development among accounting students in higher education. This study aimed to bridge a gap in the current literature, which primarily focuses on team teaching within teacher education. It also sought to explore the potential benefits for students in other disciplines who, as members of teacher teams of five or six individuals, co-planned and co-delivered an explanation of the course content via a podcast to a fictitious peer in the role of team teachers.

The findings suggest that team teaching, as a form of learning by teaching, is a powerful instructional strategy in higher education that transcends disciplinary boundaries. The accounting students in this study reported improved knowledge and enhanced competency in the topics they taught, supporting the idea that team teaching encourages active learning, promotes a greater comprehension, and supports the development of transferable skills, such as collaboration, communication, and critical thinking.

Moreover, this study provided empirical evidence supporting the notion that team-teaching models and styles could be adapted effectively to various learning contexts beyond teacher education. The application of team teaching in an accounting course created an environment conducive to collaborative learning and fostered a sense of shared responsibility for learning outcomes among students. This suggests that team teaching can potentially be a significant factor in cultivating collaborative cultures within higher education, enhancing academic outcomes, and fostering a sense of community among students.

A noteworthy observation that arose from the study was the enhanced knowledge development for low-performing students, particularly when they were presenters in the team-teaching process. Future research may further investigate this by determining whether the benefits observed resulted from the additional time spent on the intervention or were directly linked to the act of presenting.

Although this study offered valuable insights into the benefits of team teaching for student learning in accounting education, it also set the stage for future research. Further explorations are needed to delve deeper into the learning benefits of learning by team-teaching in other disciplinary contexts and using different modes of explanation. These alternative modes of explanation may, for example, enable the development of additional competencies, such as creativity. Future studies might also consider investigating the long-term effects of team teaching on students' academic performance and career development, providing even more compelling evidence of the enduring benefits of this pedagogical approach. Future research can also investigate the means to mitigate some of the challenges

of the learning-by-team-teaching intervention identified by students in this study. The identified challenges included peer compatibility challenges (like the non-participation of team members) and workload challenges.

The study has several limitations that warrant consideration. Firstly, the study aimed at providing insights into the benefits of team teaching from a student's perspective, which may have resulted in a one-sided view of the benefits of a team-teaching intervention for both knowledge and competency development. Future research should consider investigating the educators' views on the benefits of such a team-teaching intervention to provide a more holistic perspective. Secondly, this study specifically focused on students' experiences of a sequential equal-status team-teaching design. Future research could potentially compare students from other disciplines' experiences of a team-teaching intervention with a parallel or station design. A comparison of students' experiences of varying designs of the equal-status model used in this study's team-teaching intervention may contribute to improving student learning practices. Thirdly, the survey instrument of this study did not specifically focus on asking students about their experienced benefits and disadvantages of the learning-by-team-teaching intervention. Future research may consider designing a survey instrument that more specifically addresses this aspect, which can possibly provide a more detailed and comprehensive list of the benefits and disadvantages. Fourthly, increased sample sizes may strengthen the generalizability of this study's findings and assist in formulating stronger conclusions from the findings. Lastly, longitudinal research with other groups of students would also help improve the design of such an intervention, as it would provide insights into the long-term effects and sustainability of the observed benefits.

In conclusion, this study underscored the importance of team teaching in promoting collaborative learning in higher education. The findings encourage educational institutions to consider implementing team-teaching methods to enhance their students' learning experience and outcomes. Ultimately, by promoting innovative teaching methods, such as team teaching, instructors can foster more engaging and effective learning environments that prepare students for academic success and a dynamic, collaborative professional world.

Lastly, this study added to the limited research exploring the influence of team teaching on students' learning processes, particularly in disciplines other than teacher education. Therefore, the continuous exploration of the potential benefits of team teaching for students from various disciplines and a further investigation of how to best implement this approach in different educational contexts remains crucial.

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