Res High Educ (2014) 55:400–432
DOI 10.1007/s11162-013-9315-6

Preferences for Team Learning and Lecture-Based Learning Among First-Year Undergraduate Accounting Students

Evelien Opdecam · Patricia Everaert · Hilde Van Keer · Fanny Buysschaert

Received: 4 July 2012 / Published online: 25 September 2013

Abstract This study investigates students' *preference* for team learning and its *effectiveness*, compared to lecture-based learning. A quasi-experiment was set up in a financial accounting course in the first-year undergraduate of the Economics and Business Administration Program, where students had to choose between one of the two learning methods (team learning or lecture-based) and subsequently followed their preferred method of pedagogy. The quasi-experiment was administered for a first-year undergraduate class, with data for 291 students. The *first* objective of this study is to investigate students' preference in relation to their gender, ability, motivation, and learning strategy. The *second* objective is to explore whether a team-based approach is more effective than lecture-based learning, when students participate in their preferred method. The *results* show that female students had a higher preference for team learning than male students. Furthermore, students with a preference for team learning had a lower ability level, were more intrinsically motivated, had less control of their learning beliefs, were more help seeking, and were more willing to share their knowledge with peers. The team learning approach resulted in increased performance, compared to the lecture-based setting, while controlling for differences in gender and ability. This beneficial impact of team learning on performance was not found for other courses (in which team learning was not implemented), leading to the conclusion that team learning offers an appropriate learning method at the university level for a first-year course. Implications for student learning, faculty members, and institutional policy are discussed.

E. Opdecam (✉) · P. Everaert
Department of Accounting and Corporate Finance, Faculty of Economics and Business Administration, Ghent University, Sint-Pietersplein 7, 9000 Ghent, Belgium
e-mail: Evelien.Opdecam@UGent.be

H. Van Keer
Department of Education, Faculty of Psychology and Educational Sciences, Ghent University, Henri Dunantlaan 2, 9000 Ghent, Belgium

F. Buysschaert
Education Quality Control Unit, Faculty of Economics and Business Administration, Ghent University, Tweekerkenstraat 2, 9000 Ghent, Belgium

Keywords Instructional preferences · Team learning · Cooperative learning · Academic performance · MSLQ

Introduction

Recently, a growing number of conferences, journals, and books are dedicated to the quality of university teaching (Hu and McCormick 2012; Postareff et al. 2008). Universities invest a considerable amount of time and effort into recognizing effective education (Trigwell et al. 1999). Researchers have called for students to become *more active participants* in their learning process and for instructors to apply methods to increase their interaction with students (Kember 2009; Lammers and Murphy 2002). The concept of active learning has earned a prominent place in the current field of post-secondary education because of its effectiveness (Braxton et al. 2000), its improvement of student learning (August et al. 2002), and its ability to increase students' participation (Matveev and Milter 2010). *Cooperative learning* is one approach to active learning. According to Johnson and Johnson (1989), cooperative learning is the instructional use of small groups in which students work together to maximize their own and each other's learning. *Team learning* is a specific type of cooperative learning that requires an acceptable investment of time and energy from the instructor (hence applicable in large group settings) while inducing active learning by students. The core issue in team learning is that students learn not only from their own experiences but also from colleagues' experiences (Ickes and Conzales 1994).

Previous literature can be categorized in two approaches regarding the value of collaborative learning techniques in higher education (Cabrera et al. 2002). One approach states that cooperative learning techniques have *universal value for all students* (e.g., Slavin 1990; Tinto 1997). The second approach emphasizes differences in student characteristics to argue for a *differential effect* of cooperative learning methods (Johnson and Johnson 1994; Lundeberg and Moch 1995). Advocates of the latter approach call attention to the link between this instructional technique and different student outcomes (Cabrera et al. 2002). A number of factors appear to have an impact on how effective cooperative learning will be, such as the mixture of ability levels in a group (Webb 1989) and the study technique of the student (van Boxtel et al. 2000). The present study is positioned in the second stream of research, while focusing on the *preferences* of students for team learning, compared to lecture-based learning.

Students were only rarely given the opportunity to choose between learning techniques (Frymier and Shulman 1996). Choice-based learning however is in line with the movement toward greater autonomy of employers (Lewis and Hayward 2003). Increasingly, graduate students enter organizations where empowerment, self-determination and self-management are indispensable (Lewis and Hayward 2003). Millis and Cotell (1998) stated that traditional approaches to teaching and learning no longer provide students with the necessary academic and interpersonal skills for their future workplace. We have to shift to a more interactive, student-centered classroom (Millis and Cotell 1998).

Furthermore, a focus on students' preferences can be helpful in the light of the massification in higher education (Tynjälä et al. 2003). Massification has resulted not only in an expansion of the student population, but also in a *growing diversity of the students* (Schoenecker et al. 1997; Trow 1999). This diversity is reflected in different preferences for more or less active learning methods. Hu and McCormick (2012) studied undergraduate

students and stated that students have different patterns of engagement and this results in different learning patterns. Taking into account this growing diversity, we set up a between-subjects quasi-experiment with two learning paths in a large class at the first undergraduate year ($N = 291$), i.e., a lecture-based ($N = 209$) and a team learning path ($N = 82$), to answer two research questions. The *first question* is whether students' preferences for team learning (compared to lecture-based learning) are linked with specific student characteristics. In this respect, previous studies have explored gender differences and differences in ability level (e.g., Anderson and Adams 1992; Engelhard and Monsaas 1989). Few studies, however, have investigated the relationship of instructional preferences with motivation and learning strategies. Therefore, differences in learning strategy and motivation, gender, and prior achievement will be addressed in order to construct a profile card for students preferring team or lecture-based learning at the university level. In contrast with other studies in which preferences for learning methods were measured using a questionnaire, students in the present study made a *real-life choice* for the entire semester for a financial accounting course, i.e., attending either the team learning (experimental group) or the lecture-based setting (control group).

The *second question* is to explore the effectiveness of team learning, when students are taught in their preferred learning method. More specifically, the objective is to investigate differences in academic performance between team learners (experimental group) and lecture-based learners (control group), while controlling for gender and ability. In a meta-analysis of studies among college students, Johnson et al. (1991) revealed positive correlations between cooperative learning and performance, personal development (interpersonal attraction and self-esteem), and social support. The setting of the current study differs from previous studies, since students first expressed their preference for a learning method. In contrast with other studies, our study allocates *all* students to their preferred learning method, i.e., either lecture-based or team learning.

The remainder of this paper is organized as follows. First, we review the prior related literature. Next, the research method and description of the experimental procedure is provided. Following, the findings are presented and discussed. The study concludes with the limitations of the current study, suggestions for future research, and implications of the findings for accounting educators.

Theory and Hypotheses

Student Learning Preferences

Student learning preferences refer to student choices of type of classroom structure, whether in cooperation with peers or without involvement with peers. Researchers have suggested that investigating *students' learning preferences* regarding their academic environment can help instructors to select the appropriate teaching strategy and to structure the academic environment to better serve students' learning needs (Entwistle et al. 2002; Hativa and Birenbaum 2000). Moreover, Hu and Kuh (2003) stated that there is an urgent need for instructors to better understand college students, in order to design effective policies and programs in promoting students learning. This is crucial in a knowledge economy where funding and resources for the universities are rather limited (Hu and Kuh 2003). Johnson and Engelhard (1992, pp. 385–386) stated that "preferences have implications for effective instruction as well as for student learning. The study of these preferences may assist educators to better understand the different student responses to various

classroom practices and help them design more effective, relevant instructional practices that engage a broader range of students". The combination of learning preferences with collaboration suggests that teaching needs to accommodate diversity of learning preferences (Yazici 2005).

Most of the literature concerning student learning preferences has focused on two areas: (1) how *student characteristics* are related to a particular preference (e.g., Engelhard and Monsaas 1989; Wierstra et al. 2003), and (2) how *student performance* and student perception are affected when students are taught in their preferred instructional setting (Gowri Shankar and Seow 2010; Sonnenwald and Li 2003). As mentioned above, in the present study, we combine both questions. While focusing on students' preference for team learning, compared to lecture-based learning, student profile and student performance are investigated.

Team Learning

Cooperative learning is one of the most commonly used form of active pedagogy (Millis and Cotell 1998; Tsay and Brady 2010). This instructional strategy is based on the *social interdependence theory* (Johnson et al. 2007). In cooperative learning, students are assigned to small groups to complete a task, solve a problem, analyze a scenario, complete a project, or take a test. The founders of the social interdependence theory characterize a group (or team) as follows: "(a) the essence of a group is the *interdependence among members* (created by common goals) that results in the group being a dynamic whole so that a change in the state of any member or subgroup changes the state of all other members or subgroups and (b) an *intrinsic state of tension in group members* motivates movement toward the accomplishment of the desired common goals" (Johnson et al. 2007, p. 16).

Interaction with peers offers students the chance to learn not only from their own experiences but also from one another's scholarship, skills, and experiences. *Cooperation* within the team will appear only under the following set of conditions: (a) positive interdependence of team members, (b) individual accountability of team members, (c) team members' use of social skills, (d) promotive face-to-face interaction, (e) and team members reflecting on the group process (Johnson and Johnson 1989). Based on these conditions, we operationalized team learning in the current setting (see also Table 1).

Although many forms of cooperative learning exist, *team learning* is one of the most thoroughly evaluated cooperative learning techniques (Slavin 1991). Edmondson (1999) defined team learning as "an ongoing process of reflection and action, characterized by asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors or unexpected outcomes of actions" (Edmondson 1999, p. 353). Decuyper et al. (2010) noted that previous studies use different labels to describe team learning (e.g., learning in teams, team learning, or group learning) that might cover the same underlying concept. Distinctions between the different labels are not always clear. Therefore, we define team learning as a learning context where: (a) students cooperate within a small team of five to six persons; (b) where students teach each other by sharing information, discussing, making interpretations, and seeking agreement in a group solution[1]; (c) where students are the main source of information; (d) where commitment of team members is required; and (e) where stable teams work together on a long-term basis (e.g., semester).

[1] Following Huber (1991), team learning includes the processes of information acquisition, information distribution, information interpretation, convergent thinking and information storage for future use.

Table 1 Differences between the control group and the experimental group in terms of treatment

Basic element	Experimental group Team learning[a] $N = 82$	Control group Lecture-based learning $N = 209$
Positive interdependence[b]	There is commitment to team attendance in class. Students compare and discuss their solutions	Students listen to the instructor, who is presenting the solution in front of the class
Individual accountability[c]	Required preparation at home	Voluntary preparation at home
Social skills[d]	Students accept the role of team leader every fifth week. The team leader has to provide guidance and monitor the group process	No commitment to class attendance and no role to accept during class
Promotive face-to-face interaction[e]	High possibility to ask questions to peers and the instructor	Small possibility to ask questions to peers and the instructor
Group processing[f]	A team card is filled-out each class to report on the learning process as a team	No report on the learning process

[a] The operationalization of team learning fulfils the five conditions of cooperative learning as defined by Johnson and Johnson (1989)

[b] Team members perceive that they need each other in order to complete the task of the group. Students work together in small groups to maximize the learning of all members

[c] Team members' performances are individually assessed. Group members hold individual members responsible for contributing his or her fair share to the success of the team

[d] Teams cannot function effectively if members do not have/use the needed social skills. Examples of these skills are leadership, communication and decision-making

[e] Team members promote each other's productivity by helping, sharing, encouraging, and facilitating each other's effort to complete tasks and achieve the goals

[f] Teams need specific time to discuss how well they are achieving their goals and maintaining effective working relationships among members

Student Characteristics and Preferences for Team Learning

Results from studies investigating learning preferences and gender, show that men and women are socialized to think, relate and act differently and in stereotype ways (Ruiz et al. 2010). Ruiz et al. (2010) studied a large sample of secondary students (aged 12–17 years). They found that girls were less competitive and individualistic than boys, and more cooperative and affiliate. In higher education, previous studies found that female students prefer cooperative learning methods more than men in higher education (e.g., Anderson and Adams 1992; Lundeberg and Moch 1995). Investigating undergraduate students, Anderson and Adams (1992) based their argument on the fact that women's learning style emphasizes connected knowing, cooperative problem solving, and socially-based knowledge. Women prefer cooperative learning techniques because this pedagogy matches their way of learning, while men prefer traditional lecture techniques, given their more analytical, individualistic, and competitive approach to learning (Cabrera et al. 2002). Furthermore, Felder et al. (1995) investigated first-year undergraduate students in engineering. They found that women give higher ratings (in terms of a positive learning experience) to group work than men because group work provides what they believe they need to succeed academically (external help, personal interactions). However, Felder et al. (1995) added that male students might get more benefits from group work than they realize. When it comes to preferences, following the previous studies, we formulate the following hypothesis:

Hypothesis 1a *Team learning is preferred more by female students than by male students, while lecture-based learning is preferred more by male students than female students.*

In terms of *ability* and student preferences, Engelhard and Monsaas (1989) investigated the cooperative attitude of students in school settings of third, fifth, and seventh graders. They found that *less successful* students reported a higher preference for cooperative learning techniques relative to more successful pupils. In addition, Park (2001) investigated high school students and found that low ability students had a significant higher preference for group learning. High ability students on the contrary have a much greater preference for individual learning, like lecture-based learning, than low ability students. High ability students may feel that there is no use of explaining the material to low ability students and may think that they will lose time by explaining things to other students. Similar with these results, Collison (2000) studied elementary school students and found that students prefer to learn based on their level of ability. High ability students seem to be independent learners who prefer studying alone in a self-directed way. Low ability students prefer to learn with peers. Though, there is no evidence that shows that university students will have similar learning preferences as high school students.[2] Maturity might have an impact on learning preferences, however Kolb (1984) stated that learning style preferences are relatively stable over time. Extrapolating these findings leads to the following hypothesis:

Hypothesis 1b *Team learning is preferred more by lower ability students, while lecture-based students are preferred more by higher ability students.*

In terms of *motivation* as a student characteristic, no prior studies addressed the preference for team learning, compared to lecture-based learning of university students, to the authors' knowledge. However, from the definition of team learning as an active learning approach, we know that this learning approach will require an investment of time and effort from the student in terms of preparing, interacting, and discussing the material with peers. We might expect that only the highly motivated students are willing to put this higher effort and time in the learning process.

Contrary, during lectures the amount and intensity of interactions and exchanges between students and teachers is generally low and can result in anonymity and passivity of students (Biggs 1999). Poor engagement of students with course content, low commitment to courses, and low motivation appear as some of the results of being taught in large lecture-based groups (Mulryan-Kyne 2010). Based on an earlier study, we also found that the time students spend in the lecture-based setting (at home for preparation and class attendance) was lower than students taught in the team learning approach (Opdecam and Everaert 2012). In this qualitative study, undergraduate students were asked to report on the advantages and disadvantages of the lecture-based method. Students reported that they liked the fact that the lecture-based method was very time-efficient. In their perception, they were not "wasting" time by putting heavy effort beforehand at home on what the solution might be to a particular difficult exercise, since the teacher explained everything in a clear and well-organized way during the lecture. Also they were not "losing" time by explaining things they already knew to their peers and appreciated that they heard the entire explanation from the expert (i.e., the teacher). Furthermore, if they had no time to prepare the exercises before class, they could review the answer key later on, providing an

[2] To the authors knowledge, learning preferences in combination with ability were not studied in a university setting before.

autonomous way of learning. Hence, the lecture-based learning method seems to require less time, commitment, and effort in terms of preparing and attending classes than the team learning approach. Hence, we might expect that team learning will be preferred more by highly motivated students, while the lower motivated students might have more preference for the lecture-based method, leading to the following hypothesis:

Hypothesis 1c *Team learning is preferred more by higher motivated students, while lecture-based learning is preferred more by lower motivated students.*

In terms of *learning strategy*, Sonnenwald and Li (2003) reported that students prefer different learning styles and strategies, implying that they have different ways of learning. Learning style theory suggests that individuals have different ways of learning, and when teaching accommodates these styles, learning is enhanced (Sonnenwald and Li 2003). Gardner and Korth (1998) found a significant relation between student learning styles from Kolb and their perception regarding group work. They found that student with different learning styles prefer different educational activities. For example assimilators (learning by thinking and watching) consistently prefer lectures, reading, and individual work, whereas accommodators (learning by feeling and doing) prefer group work and learning by interaction with peers (Gardner and Korth 1998). Yazici (2005) found that some students prefer learning by sharing with their peers and their instructor, while other do not. Our study focuses on learning strategies and their relation to instructional preferences for either team or lecture-based learning. From the definition of team learning (Edmondson 1999), we expect that students preferring team learning will have a cooperative preference, enjoying working conjointly with peers (i.e., peer learning). Contrary, students preferring the lecture-based learning condition might have a more individualistic preference for learning, preferring a low involvement with others when learning. This leads to the following hypothesis:

Hypothesis 1d *Students preferring team learning will score higher on the learning strategy of peer learning than students preferring lecture-based learning.*

Given the fact that only limited studies have focused on motivation and learning strategy in relation to preferences for team learning (lecture-based learning), the question whether student profiles are different for students preferring team learning than for student preferring lecture-based learning has not been fully answered. Therefore, a broad measurement instrument will be administered, to explore the relationship between preferences and student characteristics.

Preferences for Team Learning and Student Achievement

Many previous studies use random assignment to treatment or compare different cohorts, where the learning approach is decided by the teacher (e.g., one group is taught by lectures, while an equivalent group is taught by team learning). Students are given only rarely the opportunity to choice between learning techniques (Frymier and Shulman 1996). Choice-based learning however would better fit the need of the present organizations, where empowerment, self-determination and self-management are indispensable (Lewis and Hayward 2003). Therefore, in the present study, students were provided the opportunity to stipulate their own learning technique: team learning or lecture-based learning.

Lewis and Hayward (2003) found that students learn better, if they are allowed to choose among learning activities based on their preferences. Tsai and Chuang (2005) showed that there is an interplay between students' preferences toward learning

environments and their epistemological beliefs. Epistemological beliefs are students' thinking and beliefs about the nature of knowledge and knowing, including definitions of knowledge, how knowledge is constructed, and how knowledge is evaluated (Hofer and Pintrich 1997). Tsai (2000) revealed that students who have more construct-oriented beliefs show significantly stronger preferences to learn in learning environments where they can interact and discuss with others in order to construct their own knowledge (e.g., team learning). Learning preferences are likely to be influential in explaining academic performance of the team members (Kunkel and Shafer 1997; Lancaster and Strand 2001). Students who have more construct-oriented beliefs (stressing the importance of knowledge *construction* while learning) tend to utilize better cognitive strategies and attain higher performance than students who have more shallow views about the construction of knowledge and learning (such as learning by memorization) (Tsai and Chuang 2005). Also, the study by Chang and Tsai (2005) found that personal preferences toward learning environments are significantly associated with performance.

Moreover, Johnson and Johnson (1989) state that some students are more predisposed than others to act cooperatively and that this disposition may influence how students cooperate with others. Students' initial attitudes toward teamwork significantly affect their performance. In particular, students who experience more discomfort when engaging in teamwork and who have a higher preference for individual work, perceive *fewer* benefits from participating in teamwork and report less improvement in learning skills, as a result of such an experience (Gowri Shankar and Seow 2010). Meanwhile, students with a *higher* preference for teamwork generally report more positive experiences in such a situation (Gowri Shankar and Seow 2010).

Finally, many previous studies found a beneficial impact of team learning on performance, compared to lecture-based learning in a higher education setting (Johnson et al. 2007; Slavin 1991). Therefore, we expect that performance will be higher for team learning than for the lecture-based learning, even if both groups are taught in their preferred way of learning. This leads to the following hypothesis:

Hypothesis 2 *Team learning, compared to lecture-based learning, has a beneficial influence on performance (where both groups are taught in their preferred instructional setting).*

Method

Educational Setting

The study was conducted during Spring 2009 in a four-credit, one semester course in the first-year undergraduate of the Economics and Business Administration Program at Ghent University in Belgium.[3] The course was titled "Advanced Financial Accounting" and is the sequel to the first semester course "Introduction to Financial Accounting". The course

[3] Ghent is situated in the northern part of Belgium and is the second largest university of Belgium. In Belgium, higher education is completely publicly financed with negligible tuition fees (about 750 dollar). In addition, access to higher education is open in Belgium, and there are no formal selection procedures or admission tests; a secondary education diploma is required and sufficient to enroll at the first undergraduate year (Duchesne and Nonneman 1998). As a result of these lenient policies, a high percentage of students (about 25 %) must repeat their entire first undergraduate year. For more information about higher education in Belgium, see Duchesne and Nonneman (1998).

used PowerPoint slides, a syllabus, and a textbook, containing the assignments of the exercises. The course presents the technique of recording transactions into a bookkeeping system and requires students to prepare the financial statements of a company, based on a set of business transactions. The financial statements are the main reports used for evaluating companies in business, and therefore the course is obliged in many disciplines. Financial accounting is considered to be a very difficult course to pass (Doran et al. 1991). The course is basically a skills course, and as such, constant practice is key to grasping the concepts. Therefore, the weekly 2.5 h lecture (theory) is supplemented by a weekly 1.5 h tutorial session (exercises). The tutorial is basically a practice session, intended to make practical exercises on the theory, discussed in the lecture. By making exercises in the tutorial session, students apply the concepts in new situations and develop answering strategies to complete new assignments.

The tutorials for the course were offered in two instructional formats, i.e., a lecture-based and a team-based format and students could select one of the formats. The lecture-based tutorial was organized in four groups, with two teaching assistants, while the team learning tutorial was coached by a third teaching assistant. All three teaching assistants[4] were well-trained in accounting, had comparable teaching skills, could rely on the same amount of experience in teaching, and were equally familiar with the content and what was required from students at the final exam.

The final (written) exam was composed of four comprehensive exercises, i.e., journal entries, T-accounts, balance sheet, and income statements to fill out, which were similar in format to the exercises of the tutorial sessions. The final exam was split-up in different parts and each corrector graded the same part for all students. Therefore, controlling for instructor grading differences was not necessary.

Sample

The sample consists of students who took the exams for both the introductory and advanced financial accounting course and filled-out the pre-test questionnaire. There were 19 repeating-students omitted and the sample contained no international students. Complete data were available for 291 students, of which 209 (72 %) selected the lecture-based learning approach, and 82 (28 %) opted for team learning.

Design and Treatment

The study was designed as a quasi-experiment, where students were allocated to their preferred learning approach (lecture-based or team learning). The design followed an untreated control group design with pre-test (Cook and Campbell 1979; Creswell 2003).

In the *lecture-based group* (control group), the students decided whether or not to prepare their exercises at home before attending the tutorials. During class time, the instructor presented the solution key while the students observed. The format was primarily lecture-based, with limited interaction between the students and the teacher. There was no registration of class attendance (which is the normal procedure at this university), and the full solution key was posted on the Blackboard online system after each class. Although students were passive observers, students were satisfied with this format because the answer key was presented stepwise, as in a worked example.

[4] In Belgium, teaching assistants are part of the faculty of the University and have at least a master degree.

In contrast, in the *team learning condition* (experimental group), all team members were stimulated to prepare the exercises before class. During the tutorials, they sat together with their teammates and discussed the different steps to come to a group solution. Only when all team members came prepared to the tutorials a real discussion and a converging solution of the exercises could take place within the team. Hence, *positive interdependence* of students within the team was built in. Furthermore, a team card that structured the discussion was implemented, following Klein and Doran (1999), who found that interdependence created by providing roles or structured guidelines has beneficial effects on performance. Each team learner was required to be the team leader every fifth week. The team leader had to complete the team card, providing information on the attendance and individual preparation of the team members. By registering and discussing the individual preparation of the students, it became clear how much effort each student put into the assignment (*individual accountability*). In addition, the team leader provided guidance and monitored the group process during the tutorial (*social skills)*. The team learners were expected to ask questions, give feedback, reflect on the different solutions, and discuss errors and unexpected outcomes (engagement in *promotive face-to-face interaction)*. At the end of the session, some time was allotted to evaluating the team process. The team members had to evaluate the progress made as a group and rated the group with a score for the group process, which was also written on the team card (*group process*). In sum, the treatment for team learning fulfilled the five basic elements of cooperation, proposed by Johnson and Johnson (1989), as shown in Table 1.

In addition, the instructor's role was quite different in the team and lecture-based learning conditions. In the lecture-based learning condition, the instructor served as the primary and only source of information. In the team learning condition, the instructor set the learning tasks, monitored the functioning of the teams, and provided feedback when necessary. The major resources for learning were students' team members rather than the instructor.

Procedures

Students were familiar with lecture-based learning from the previous semester (introductory financial accounting), while team learning was added as a new learning path. Therefore, students were introduced to team learning in the last week of the first semester. During the orientation session, students received handouts explaining the content and practical organization of both learning paths. In the beginning of the second semester, this information was repeated, so that students were able to make an informed choice. Then, students formally subscribed to one of the approaches. After the choice was made, the pre-test survey was administered during official class time of the lectures. Students entered only their student ID code and not their name. They were assured that neither the teacher nor the university administration would have access to the data and that all personal information would be strictly confidential.

Variables

Gender and Ability

Gender was registered during the pre-test survey (1 for male, 2 for female). Following Doran et al. (1991), we use grade-point average (GPA) as proxy for ability. Two modifications are made: (1) we use students' GPA for the first semester (Fall) courses only, i.e.,

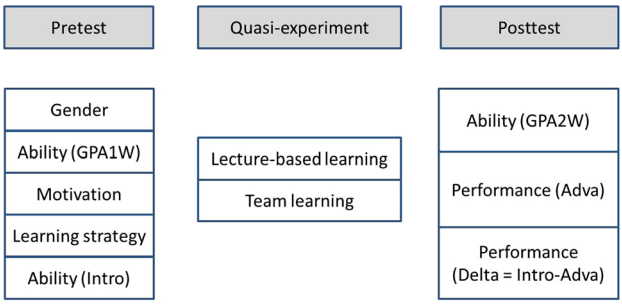

Fig. 1 Measurement of the variables

the ability before the quasi-experiment took place, and (2) we excluded the grade of the first semester accounting course from the GPA. This resulted in the measure 'GPA semester 1 without accounting' (GPA1W, mark on 440), which is a proxy for ability in general. In addition, we included a proxy for ability for accounting, by using the final exam score for the introductory financial accounting course in the first semester (Intro, mark on 40) (Fig. 1).

Performance

Performance was measured in two ways: as a post-test and as a delta measure. First, for the post-test measure, the grades obtained on the final exam of the course in the Spring semester were used (Adva, mark on 40). Second, for the delta measure, performance was measured as the difference between Intro and Adva (Delta Intro–Adva). Most students earned a higher score on the Intro because it is an introductory course with an easier-to-learn content than the advanced course. As a result, the delta has a positive sign for most students.

Performance in other courses

To control for a possible general increase in the effort of the students in the second semester (Spring), we also calculated the GPA for the second semester courses, again excluding the grade for the second semester accounting course (GPA2W, mark on 480).

Motivation and Learning Strategy

These variables were measured by the items of the Motivated Strategies for Learning Questionnaire (MSLQ) of Pintrich et al. (1991). Since limited research is available on student characteristics and preference for team learning (lecture-based learning), we decided to administer *all* MSLQ items in the pre-test survey. The MSLQ has been successfully used for higher education students in the past (Hativa and Birenbaum 2000).

The *motivational scales* of the MSLQ are based on a broad social-cognitive model of motivation that consists of three constructs: value beliefs, expectancy, and affect. First, the value components focus on the reasons why students engage in academic tasks. The value scales are based on both achievement goal theory (e.g., Ames and Archer 1988) and expectancy value theory (e.g., Wigfield and Eccles 2000). The MSLQ includes three subscales to measure value beliefs: *intrinsic goal orientation* (focus on learning), *task*

value beliefs (judgments regarding how interesting, useful, and important the course content is to the student), and *extrinsic goal orientation* (focus on grades and approval from others). Expectancy components refer to students' belief that they can accomplish a task and include both *control of learning beliefs* and *self-efficacy for learning and performance*. The third general motivational construct is affect, which has been operationalized based on the responses to the *test anxiety* scale, which taps into students' concerns about taking exams.

The *learning strategy section* of the MSLQ consisted of four components: 18 items concerning students' use of different cognitive learning strategies, 12 items concerning metacognitive learning strategies, 12 items concerning students' management of different resources, and seven items concerning peer learning and help seeking. The first scale is based on a general cognitive model of learning and information processing. Cognitive learning strategies involve *rehearsal, elaboration* (ability to expand prior knowledge in detail), *organization, and critical thinking*. The second category is metacognitive self-regulation (ability to control one's cognitive processes). Students' management of different resources was measured through *time/study environmental management* and *effort regulation*. Finally, the MSLQ has a scale for *peer learning* and *seeking help*. Peer learning measures how effective an individual student is in using peers as a resource for learning. Help seeking measures students' intention to seek help from the instructors and other staff.

In terms of operationalization and validation of the MSLQ measure, we took several steps. *First*, we translated (and back translated) the scale of Pintrich et al. (1991) from English to Dutch. *Second*, in line with Duncan and McKeachie (2005), we included the words "for this course" to the items, because the objective was to assess the motivation and learning strategy of students for a particular course (i.e., Advanced Financial Accounting). *Third*, we ran a pilot study in the same course in Spring 2008 to evaluate the translated MSLQ measure. Based on the Cronbach's alpha's and factor loadings on the data in this pilot study ($N = 405$), 17 of the 81 items were reformulated. No items were omitted based on the pilot study. Only the wording of 17 items were slightly changed in order to improve the scale and to make the instrument more suitable for the educational context of this study. For example, we changed the original item (I try to work with other students from this class to complete the course assignments) into the applied item (I try to work with other students from this class to prepare the exercises), because we used exercises instead of assignments in the present course.

The final items are presented in Appendices 1 and 2. Items marked by an asterisk were adapted. *Fourth*, an exploratory factor analysis (principal component analysis) with varimax rotation[5] was conducted for the motivation scales and the learning strategy scales separately, similar to the developers of these scales (Pintrich et al. 1993). For the motivation scale, four items were deleted; for the learning strategy scale,[6] 18 items were deleted (marked by an X in the last column of Appendices 1 and 2). Following Hair et al. (2006), we deleted these items because (a) the item loading value was smaller than .40 or (b) the item loaded on more than one factor (absolute value of .35 or higher). By deleting these items, the construct for control of learning belief resulted in only two items, which can affect the validity of this scale. Therefore, we should be careful by interpreting future results of control of learning beliefs. In addition, a five factorial solution seemed the best solution for the motivation scales. Similar with recent research of Cho and Summers

[5] An oblique rotation (which allows correlation between factors) was also performed and resulted in similar factors and factor loadings.

[6] If we do *not* delete these items, the main results remain unchanged.

(2012) on the MSLQ, task value and intrinsic goal orientation were loading on the same factor, and therefore they were combined into one scale. *Fifth*, to check the reliability of the final items, the Cronbach's alpha was calculated for each construct and could not be improved by deleting items. A low Cronbach's alpha was found for the scale rehearsal ($\alpha = .43$). Therefore, this construct was omitted from the model (marked by a D in the last column of Appendix 2). The Cronbach's alpha for the five motivation scales (see Appendix 1) ranged between .59 and .93. The Cronbach's alpha for the eight learning strategy scales (see Appendix 2) ranged from .55 to .80, which is reasonably acceptable (except for peer learning) (Hair et al. 2006) and comparable with previous research (Cho and Summers 2012; Hativa and Birenbaum 2000; Pintrich et al. 1993). *Sixth*, the Cronbach's alphas were—once again—compared to earlier studies using the MSLQ for higher education students (Hativa and Birenbaum 2000). Their sample consisted of 175 undergraduates enrolled in the engineering and education school at a major university in Israel. The lowest Cronbach's alpha for the motivation scale in Hativa and Birenbaum (2000) was found for extrinsic goal orientation ($\alpha = .61$), similar to the lowest value in our study ($\alpha = .59$). Also, the highest alpha was found for self-efficacy ($\alpha = .86$) similar to our study ($\alpha = .93$). Remarkable is that for the learning strategy scale, the low Cronbach's alpha for team learning ($\alpha = .55$) was also found in their study ($\alpha = .55$), leading us to decide not to delete this variable from our study. At the bottom of Appendices 1 and 2, we included all reliability measures of Hativa and Birenbaum (2000).

Similar to the original scale of Pintrich et al. (1991), the scores for each of the five motivation and eight learning strategy subscales are constructed by taking the mean score for the remaining items. The negatively worded items were reverse scaled (see Appendices 1 and 2 for these items), so that the statistics reported represent the positive wording of the variables.

Data Analysis

There were several steps involved in analyzing the data. Validity and operationalization of the MSLQ was established through factor analysis, and was found to be at an adequate level. This is described in the previous section. Descriptive statistics were employed to report the distribution of the variables in general and for both learning paths. A correlation table was provided in order to describe the relationships between the variables. To answer the hypotheses, several crosstabs, Chi-square tests, *t* tests, and univariate analyses were conducted.

Results

Descriptives and Correlations

The means on the motivation and learning strategy scales ranged from 3.16 to 5.60, with corresponding standard deviations between .83 and 1.37. The performance was on average lower for Adva ($M = 17.85$) than for Intro ($M = 18.92$), resulting in a positive mean for Delta Intro–Adva of 1.07, as expected (Table 2).

The zero-order correlations between the different scales are shown in Table 3. Not surprisingly, the two GPA measures were highly correlated ($r = .866$, $p = .000$). Similar, the performance measure Adva was also highly correlated with Intro ($r = .692$, $p = .000$), GPA1W ($r = .763$, $p = .000$) and GPA2W ($r = .771$, $p = .000$). Furthermore, *in terms of*

Table 2 Descriptives

	N	Min	Max	Mean	SD	LBL		TL		*t* value	*p* value
						N	Mean	N	Mean		
Motivation											
Intrinsic goal orientation & task value	291	1.90	6.30	4.86	.83	209	4.75	82	5.14	−3.70	.000
Extrinsic goal orientation	291	3.00	7.00	5.60	.88	209	5.52	82	5.80	−2.45	.015
Control of learning beliefs[a]	291	1.50	7.00	4.35	1.27	209	4.48	82	4.01	2.88	.004
Self-efficacy for learning & performance	291	1.00	7.00	4.25	.94	209	4.35	82	4.02	2.71	.007
Test anxiety	291	1.00	6.75	4.10	1.18	209	4.01	82	4.35	−2.02	.045
Learning strategy											
Elaboration	291	2.00	6.67	4.61	.97	209	4.65	82	4.50	1.25	.213
Organization	291	1.00	7.00	4.24	1.37	209	4.16	82	4.45	−1.62	.106
Critical thinking	291	1.00	6.20	3.83	.93	209	3.84	82	3.80	.39	.696
Metacognitive self-regulation	291	2.25	7.00	4.92	.83	209	4.92	82	4.92	−.08	.936
Time/study environmental management	291	1.33	7.00	5.15	1.08	209	5.17	82	5.09	.63	.530
Effort regulation	291	1.25	7.00	4.76	1.05	209	4.78	82	4.69	.68	.496
Peer learning[b]	291	1.00	6.67	3.16	1.01	209	3.03	82	3.50	−3.61	.000
Help seeking	291	1.00	7.00	4.06	1.27	209	3.89	82	4.49	−3.65	.000
Ability[c]											
GPA1W (mark on 440)	291	49.00	377.00	240.10	64.74	209	245.83	82	225.50	2.43	.016
Intro (mark on 40)	291	2.00	38.00	18.92	8.92	209	19.57	82	17.27	1.99	.047
Performance[c]											
Adva (mark on 40)	291	.00	40.00	17.85	9.30	209	18.13	82	17.15	.81	.421

Table 2 continued

	N	Min	Max	Mean	SD	LBL		TL		*t* value	*p* value
						N	Mean	N	Mean		
Delta Intro–Adva	291	−20.50	16.00	1.07	7.16	209	1.44	82	.12	1.43	.154
Performance on other courses[c]											
GPA2W (mark on 480)	291	80.00	427.00	266.46	75.45	209	272.66	82	250.67	2.25	.025

LBL lecture-based learning, *TL* team learning

[a] Scale based on two items

[b] Scale with a low Cronbach's alpha ($\alpha = .55$)

[c] This information is obtained from administrative records

Table 3 Correlations

	1	2	3	4	5	6	7	8	9	10
1. Intrinsic goal orientation & task value	1									
2. Extrinsic goal orientation	.320**	1								
3. Control beliefs	.093	.059	1							
4. Self-efficacy for learning and performance	.444**	.001	.350**	1						
5. Test anxiety	.039	.280**	.003	−.272**	1					
6. Elaboration	.135*	−.017	.067	.176**	−.022	1				
7. Organization	.212**	.155**	−.027	−.014	.116*	.166**	1			
8. Critical thinking	.167**	.019	.146*	.210**	.020	.483**	.064	1		
9. Metacognitive self-regulation	.248**	.056	−.020	.129*	.005	.309**	.224**	.398**	1	
10. Time and study environmental management	.166**	.067	−.041	.224**	−.114	.162**	.091	.106	.104	1
11. Effort regulation	.316**	−.071	−.170**	.315**	−.237**	.195**	.113	.053	.237**	.420**
12. Peer learning	.214**	.047	.064	.197**	−.001	.235**	.152**	.316**	.194**	.089
13. Help Seeking	.312**	.166**	−.168**	.087	.109	.196**	.279**	.116*	.230**	.182**
14. GPA1W	−.022	−.343**	−.117*	.180**	−.179**	.244**	−.072	.195**	.167**	.203**
15. Intro	.146*	−.430**	−.088	.264**	−.183**	.128*	−.063	.115	.069	.109
16. Adva	.155**	−.379**	−.119*	.253**	−.272**	.141*	−.105	.128*	.101	.124*
17. Delta Intro–Adva	−.019	−.043	.044	.000	.125*	−.023	.058	−.024	−.045	−.024
18. GPA2W	.008	−.359**	−.052	.211**	−.192**	.189**	−.057	.176**	.166**	.194**
19. Gender	.164**	.056	−.279**	−.192**	.123*	−.029	.259**	−.196**	.055	.021

Table 3 continued

	11	12	13	14	15	16	17	18	19
11. Effort regulation	1								
12. Peer learning	.154**	1							
13. Help Seeking	.234**	.461**	1						
14. GPA1W	.395**	.065	.043	1					
15. Intro	.318**	.084	.077	.628**	1				
16. Adva	.359**	.055	.092	.763**	.692**	1			
17. Delta Intro–Adva	−.070	.033	−.024	−.208**	.347**	−.437**	1		
18. GPA2W	.373**	.076	.056	.866**	.634**	.771**	−.213**	1	
19. Gender	.189**	−.055	.220**	.050	.100	.051	.057	−.010	1

* $p < .05$; ** $p < .001$

the motivation subscales, intrinsic goal orientation was significantly positively correlated with Intro ($r = .146$, $p = .005$), as well as with Adva ($r = .155$, $p = .000$). Note that extrinsic goal orientation was significantly but negatively correlated with Intro ($r = -.430$, $p = .000$), and Adva ($r = -.379$, $p = .000$). This was expected because students knew their score for the courses of the first semester (Intro) at the time of the pre-test. Hence, students with a low grade on Intro were highly motivated to obtain a good grade for the Adva course and hence scored high on extrinsic goal orientation. Concerning ability, we can state that GPA1W is negatively associated with extrinsic goal orientation ($r = -.343$, $p = .000$). This was more or less expected because lower ability students seem to have a higher extrinsic goal orientation, because they are eager to pass. Ability is also negatively correlated with control of learning belief ($r = -.117$, $p = .005$), however we have to be careful concerning this result because the scale of control of learning belief is only based on two items. More interestingly, low ability is associated with a higher level of test anxiety ($r = -.179$, $p = .000$). Apparently, low ability students have failed before and are fearful to fail again.

Concerning gender we can state that female students report a higher intrinsic motivation ($r = .164$, $p = .000$) and test anxiety ($r = .123$, $p = .005$) in comparison to male students. These results still hold in an ANCOVA, while controlling for the differences in ability (GPA1W), ($F = 8.12$, $p = .005$ and $F = 5.29$, $p = .022$ respectively). Furthermore, male students report a higher control of learning belief ($r = -.279$, $p = .000$) and higher self-efficacy ($r = -.192$, $p = .000$), which is both confirmed in the ANCOVA while controlling for GPA1W ($F = 23.63$, $p = .000$ and $F = 12.60$, $p = .000$, respectively).

Finally, in terms of *learning strategies*, GPA1W was significantly positively correlated with elaboration ($r = .244$, $p = .000$), critical thinking ($r = .195$, $p = .000$), metacognitive self-regulation ($r = .167$, $p = .000$), time/study environment management ($r = .203$, $p = .000$), and effort regulation ($r = .395$, $p = .000$). Similar positive relationships were found between learning strategies and performance on the course (Adva). Students who elaborate on the course material ($r = .141$, $p = .05$), pose critical questions when studying ($r = .128$, $p = .05$), make good use of their study time ($r = .124$, $p = .05$), and continue studying even the uninteresting parts ($r = .359$, $p = .000$), apparently receive a higher grade on the course. Note that performance in terms of Intro, Adva, or GPA1W was *not* significantly (or negatively) correlated with organization. Hence, reporting to be well-organized seems not to result in higher grades (Intro, Adva, or GPA1W).

Hypotheses Testing

To test hypothesis 1a, differences in *gender* between the two learning conditions were analyzed (see Table 4). The Chi- squared test shows that the preferred learning path differed significantly by gender ($\chi^2 = 11.47$, $p = .001$). In general, females represent 46 % of the sample, and males 54 %. However, approximately 62 % of the team learning students were female students, whereas only 38 % of the team learning students were male students, supporting the first hypothesis 1a.

Concerning *ability*, significant differences emerged between the two groups prior to the manipulation (Table 2). GPA1W ($t = 2.43$, $p = .016$) and Intro ($t = 1.99$, $p = .047$) were significantly higher for the students who opted for lecture-based learning than for students who selected team learning (if a p value of .05 was used). However, this significant result no longer holds at a more conservative p value of .01. In addition, we divided the sample in a low and high ability group (two equal size groups based on the median of GPA1W). The crosstab of learning path by the ability dummy showed a

Table 4 Crosstab gender by learning path (panel A), crosstab ability by learning path (panel B) and crosstab ability and gender by learning path (panel C)

	Lecture-based learning		Team learning		Total	
	N	%	N	%	N	%
Panel A[a]						
Male	125	60	31	38	156	54
Female	84	40	51	62	135	46
	209	72	82	28	291	100
Panel B[b]						
Low ability	94	45	51	62	145	50
High ability	115	55	31	38	146	50
	209	72	82	28	291	100
Panel C						
Low ability[c]						
Male	57	61	23	45	80	55
Female	37	39	28	55	65	45
	94	65	51	35	145	100
High ability[d]						
Male	68	59	8	26	76	52
Female	47	41	23	74	70	48
	115	79	31	21	146	100

[a] $\chi^2 = 11.47$; $p = .001$

[b] $\chi^2 = 6.99$; $p = .008$

[c] $\chi^2 = 3.23$; $p = .072$

[d] $\chi^2 = 10.87$; $p = .001$

significant Chi-square test ($\chi^2 = 6.99$, $p = .008$). As shown in Panel B, the majority of the students in the lecture-based group came from the high ability group (55 %). Contrary, the majority of the students in team learning came from the low ability group (62 %), implying that team learning is preferred more by lower ability students, which supports hypothesis 1b.

When combining gender and ability in relation to the learning path, panel C shows the gender by learning path crosstab for the low and high ability students separately. Concerning the high ability students, we found a significant Chi-square test ($\chi^2 = 10.87$; $p = .001$), where more high ability female students were attracted by team learning and where more high ability male students were attracted by lecture-based learning. The same trend is found for the lower ability students, however the Chi-square test was not significant at the .05 level ($\chi^2 = 3.23$; $p = .072$).

Students differed in terms of *motivation* on all items and on both help seeking and peer learning in terms of *learning strategy* (see Table 2). In addition, from the correlation table (see Table 3), we know that ability was correlated with (most of) the learning strategy subscales and motivation scales. From the previous paragraphs, we know that there are significant differences between the preferred learning paths in terms of ability and gender mix. Therefore, ANCOVAs were added to examine the differences in terms of students' motivation and learning strategies while controlling for GPA1W and gender (see Table 5). The results indicate that team learners reported a higher intrinsic motivation and task value

Table 5 ANCOVA on MSLQ and performance

Dependent variable	Lecture-based learning (estimated marginal mean)	Team learning (estimated marginal mean)	*F*	*p*
Panel A: MSLQ (covariate: gender and GPA1W)				
Motivation				
Intrinsic goal orientation & task value	4.76	5.11	10.03	.002
Extrinsic goal orientation	5.55	5.72	2.18	.141
Control of learning beliefs[a]	4.46	4.08	5.56	.019
Self-efficacy for learning & performance	4.31	4.11	2.72	.100
Test anxiety	4.05	4.23	1.38	.242
Learning strategy				
Elaboration	4.63	4.56	.30	.586
Organization	4.21	4.32	.31	.580
Critical thinking	3.80	3.90	.74	.391
Metacognitive self-regulation	4.91	4.94	.11	.741
Time/study environmental management	5.16	5.13	.04	.852
Effort regulation	4.77	4.72	.14	.711
Peer learning[b]	3.01	3.55	17.12	.000
Help seeking	3.92	4.43	9.77	.002
Panel B: ability (covariate: gender and GPA1W)				
Intro (mark on 40)	19.17	18.29	.89	.347
Panel C: performance (covariate: gender and GPA1W)				
Adva (mark on 40)	17.50	18.77	.247	.117
Delta Intro–Adva	1.68	−.48	5.28	.022
Panel D: performance on other courses (covariate: gender and GPA1W)				
GPA2W (mark on 480)	266.35	266.73	.01	.940

[a] Scale based on two items

[b] Scale with a low Cronbach's alpha ($\alpha = .55$)

($F = 10.03$, $p = .002$), when including the control variables. Hence hypothesis 1c was supported. In addition, lecture-based learners reported a significantly higher control of learning beliefs ($F = 5.56$, $p = .019$), but as mentioned before, this scale is based on a limited amount of items. Similar to the *t* test, the ANCOVAs showed significant differences for peer learning and help seeking. Not surprisingly, team learners attached higher importance to peer learning ($F = 17.12$, $p = .000$), supporting hypothesis 1d. In addition and rather unexpected, team learners reported significantly higher help seeking ($F = 9.77$, $p = .002$) than students preferring lecture-based learning. A summary of the profile of students preferring lecture-based learning and team learning is given in Table 6.

To address the second hypothesis, a two tailed *t* test was used to analyze the performance differences between the two groups at the pre-test and post-test. As described above (Table 2), the ANOVA revealed a significant main effect of learning path on Intro

Table 6 Summary of the results: Profile card of students preferring

	Lecture-based learning	Team learning
Gender	More male students	More female students
Ability	More higher ability	More lower ability
	More high ability male students	More high ability female students
Motivation		
	Lower intrinsic goal orientation & task value*	Higher intrinsic goal orientation & task value*
	Lower extrinsic goal orientation	Higher extrinsic goal orientation
	Higher control of learning beliefs*	Lower control of learning beliefs*
	Higher self-efficacy for learning and performance	Lower self-efficacy for learning and performance
	Lower test anxiety	Higher test anxiety
Learning strategy		
	Lower help seeking*	Higher help seeking*
	Lower peer learning*	Higher peer learning*
	No significant differences on elaboration	
	No significant differences on organization	
	No significant differences on critical thinking	
	No significant differences on metacognitive self-regulation	
	No significant differences on time/study environmental management	
	No significant differences on effort regulation	

* Still significant after controlling for gender and ability (GPA1W)

($t = 1.99$, $p = .047$), but no significant effect on Adva ($t = .81$, $p = .421$) or Delta Intro–Adva ($t = 1.43$, $p = .154$). This implies that students with a lower grade for Intro preferred the team learning approach, while this lower grade was no longer found for Adva.

Again, because we know that both gender and ability are correlated with performance, an ANCOVA was used to investigate whether performance differed between team learning and lecture-based learning while controlling for GPA1W and gender. As shown in Table 5, the main effect of learning path was not significant for Intro ($F = .89$, $p = .347$) and Adva ($F = .247$, $p = .117$). In contrast, if we use a p value of .05, the main effect of learning path was significant for the Delta measure (Intro–Adva) in the ANCOVA, while controlling for GPA1W and gender ($F = 5.28$, $p = .022$). The difference between the score on the introductory and advanced accounting course is significantly less pronounced for team learners (estimated marginal mean $= -.48$) compared with lecture-based learners (estimated marginal mean $= 1.68$). In other words, the gap between the scores for Intro and Adva is larger for lecture-based than for team learners. As shown in Fig. 2 and based on a small significant effect, the team learners started at a lower performance level but outperformed the lecture-based learners at the end of the experiment (while controlling for gender and ability differences), which supports the second hypothesis. Again, we need to add that if a more conservative p value was used as significance level (e.g., $p < .01$), the second hypothesis could not be supported.

From hypothesis 1b, we believe that students with a lower ability (GPA1W) more often opted for team learning. Therefore, we want to check what happens with GPA2W. It is

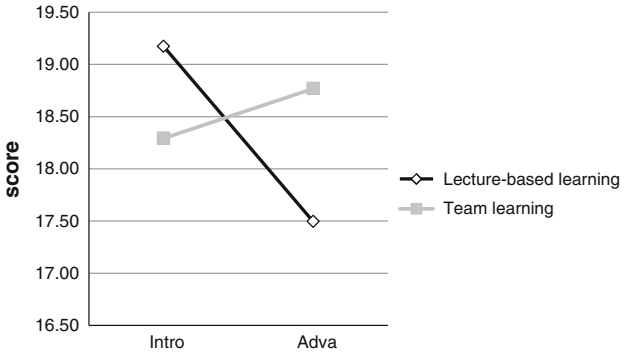

Fig. 2 Estimated marginal means for Intro and Adva, based on the ANCOVA analysis with gender and GPA1W as covariate

arguable that these students (who opted for team learning) increased their effort or altered their study behavior for all courses during the second semester (explaining the significant Delta Intro–Adva). In this case, we should see an effect of learning path on all second semester courses. An ANCOVA with GPA2W as a dependent variable and gender and GPA1W as covariates revealed no significant results (see Table 5; $F = .01$, $p = .940$). It appears that students of both learning paths obtained equal scores for GPA2W. Hence, students who opted for team learning did not show significant improvement for other second semester courses. Therefore, we can conclude that the selected team learning approach was helpful in increasing students' performance of accounting, for those students who preferred team learning.

Discussion

The results of the present study build on findings from prior research on team learning, learning preferences, and their relationship with performance. Two learning paths were offered to freshmen accounting students: team learning and lecture-based learning. Students could select their preferred learning path for the tutorials of an advanced financial accounting course. Their preference was expressed at the beginning of the semester and students were taught in their preferred way for the entire semester (12 weeks), allowing no switching in between. The results indicate that students opting for the team learning path have a specific profile that varies in several domains from that of students preferring lecture-based learning.

First, female students had a larger preference for team learning than male students, supporting the results of Johnson and Engelhard (1992), who studied learning preferences of African-American adolescents. Moreover, more high ability female students were attracted to the team learning path in comparison to the lecture-based learning path. It appears that male students are more reluctant to share their knowledge with peers. It appears they preferred to optimize their learning time and were more reluctant to put effort and commitment into team learning. Female high ability students on the contrary, preferred team learning and appear to be more inclined to share their knowledge with peers.

Second, the groups differed significantly on ability. Students preferring team learning generally obtained a lower score in the introductory accounting course in the previous

semester and a lower score on GPA1W, suggesting that the brighter students were more likely to select lecture-based learning. Possibly the lower results for the introductory course and GPA1W may have stimulated low achieving students to alter their learning method and to opt for team learning in the second semester. Similarly, Engelhard and Monsaas (1989) found that academic achievement is related to learning preferences, with more successful students reporting a higher preference for competition (e.g., lecture-based learning), whereas less successful students report a higher preference for cooperation. Love et al. (2010) concluded that negative goal discrepancies are likely to lead to increased efforts, as students attempt to increase their performance to achieve the goal of passing the course. In this respect, it seems that students who failed at the introductory course suffered from negative goal discrepancies. Based on the theory of Love et al. (2010), these students increased their commitment and opted for team learning in the second semester course.

Third, students selecting team learning reported more intrinsic motivation and attached a higher importance to task value. Team learning students reported being more intrinsically interested in accounting and eager to study the course material. Hence, by providing students the possibility to opt for a particular learning path, only the highest intrinsic motivated students are attracted by team learning.

Fourth, the groups also differed in terms of control of learning beliefs. The students who preferred the lecture-based approach scored significantly higher on the pre-test in terms of learning beliefs than did the students who preferred team learning. These results should be interpreted with caution though, since this scale is only based on two items. However after controlling for gender and ability, the differences in terms of control of learning beliefs still remained.[7] Hence, students opting for team learning were more uncertain whether the performance was contingent on their individual efforts. Probably, they presumed that they would not be able to understand the material by themselves and therefore selected team learning.

Fifth, not surprisingly, team learners reported significantly higher peer learning. In addition, students preferring team learning scored significantly higher on help seeking compared with lecture-based learners (even after controlling for gender and ability). The students preferring team learning reported a greater need for support and guidance, both from peers and the teacher, which was indeed more available in the team learning environment.

Sixth, we found that the team learning and lecture-based learners seem to report similar learning strategies (apart from help seeking and peer learning) and are consequently comparable in terms of their approach to learning. Moreover, the correlations reveal that high ability and high performance for the course is linked to so-called deep-level learning strategies (high elaboration, critical thinking, effort regulation, and management of the time/study environment). The positive correlation between high performance and organization was not found.

Seventh, unlike previous studies, this quasi-experiment was organized over the entire semester, making it possible to show results based on students' experiences throughout 12 weeks of classes. This specific form of active learning demonstrated positive educational outcomes for students who opted for team learning. The design made it possible to compare pre-test with post-performance without interim performance measures (e.g., mid-term exams). The major question posed was whether lower ability students benefited from team learning. The team learners had a significantly ($p < .05$) lower score for the

[7] IF we include all four items, we get the same significant results ($p = .000$ for the t test and $p = .001$ for the ANCOVA).

introductory course, but they managed to overcome this difference on the advanced course. In other words, team learning students caught up with the lecture-based learning students in performance after the team learning intervention. Indeed, the ANCOVA did not show a significant effect on the performance of the course (Adva), even if these students in the team learning path initially started with a lower ability in accounting (Intro) and in general (GPA1W). In addition, we found an effect of team learning on Delta Intro–Adva. The difference between the introductory and advanced course scores tends to be higher for the lecture-based learners, indicating that the score for the advanced course decreased more for lecture-based students than for team learners. This result highlights the fact that—despite their low general ability—the team learning students scored similarly on the advanced accounting test as did the lecture-based learning students. This trend is in line with the previous literature, which found that small groups facilitate academic learning (Johnson and Johnson 1989; Slavin 1991; Vasquez et al. 1993). To understand why team learning had worked for these students, answers probably lie in the social interaction process (Lundeberg and Moch 1995). In Vygotsky's view, modeling and speaking precede learning and thinking. Social interaction enhances thinking because students can learn to solve tasks independently by first tackling tasks together with peers in the team (Lundeberg and Moch 1995). The scaffolding process occurs when less skilful students actively cooperate with more competent peers and thereby enable the lower ability students to develop more complex levels of understanding and skills by providing them feedback (Onwuegbuzie and DaRos-Voseles 2001).

Limitations and Future Research

It is important to note that the current study has certain limitations. *First*, the study implemented only two learning paths. In this way, we could make a clear distinction between lecture-based and team learning. It would be interesting and challenging to compare student characteristics and their preferences if *more* learning paths were offered in a similar context. For instance, short videos and online exercises both induce almost no face-to-face interaction with peers/teacher, but differ in terms of the active learning component. Hence, it would be interesting to investigate whether the differences we found in student profile also apply to short videos compared to online exercises. *Second*, this study was limited to first-year undergraduate students at one institution, where we experiment since several years with team learning in a large class at the undergraduate level. To enhance insights into potential cultural differences, it would be interesting to investigate similar learning path choices at other universities and in different settings. Therefore, we invite colleagues to offer team learning at their institutions as an alternative to lecture-based learning, to replicate and extent our findings on the student profile card. *Third*, the quasi-experiment was run in one particular course in the second semester at the first undergraduate year. Hence, no conclusions can be made whether or not student preferences for team or lecture-based learning is course specific. Furthermore, it would be interesting to investigate the influence on performance, if students could make the choice for all courses (tutorials) between team and lecture-based learning. *Fourth*, this study was implemented in an authentic educational context. Once students expressed their learning preference, they were allocated to this learning method for the entire semester, allowing no switching. Students were used to the lecture-based learning condition at the university, while they were only familiar with team learning from their high school period. However, at the end of the semester, we asked team learners whether they still preferred team

learning and approximately 85 % answered positive.[8] Hence, future research might focus on students who were originally interested in the team learning approach but who subsequently were not willing to put effort into discussing the material with their teammates. *Fifth,* the sample size of our study is rather small and the amount of analyses is rather high. A more conservative *p* value of .01 could be recommended. As a result, if a more conservative *p* value was used, some of our hypotheses could not be supported (e.g., effect on performance). Although we were careful while interpreting the results, it would be interesting to replicate the study with a larger sample. *Sixth*, this study can be subject to a self-selection bias. Specifically, students opted for one of the two learning conditions. Although in the present study, we aimed to measure the influence of team learning on academic performance, given that students themselves can stipulate their learning condition. However this selection bias can affect the internal validity of the study because respondents with certain characteristics may be more affected by the treatment condition (van der Laan Smith and Spindle 2007). In order to reduce this bias, we included covariates in our statistical tests.

In addition, the results also lead to some suggestions for future research. *First*, the results indicate that a specific group of students preferred team learning. These students are more intrinsically motivated and are willing to share their knowledge with peers and with the instructor. The higher help seeking and lower score on control of learning beliefs of students preferring team learning needs further investigation. Further research could also focus on other personal characteristics such as self-awareness or consciousness. *Second*,[9] the relationship between gender, ability, and motivation should be further investigated in relationship to learning preferences. Team learning was preferred more by lower ability students than by high ability students in general (but was also more preferred by high ability female students than by high ability male students). Team learning was preferred more by highly motivated students, even after controlling for the gender and ability effect. In this respect, studying learning preferences in relationship to gender, ability and motivation opens many routes for future research. *Third*, the innovativeness of the present research is that the students stipulated themselves their learning path. Hence, we did not "imply" team learning to a group of students, who might be willing or not willing to put effort into cooperating with team members. Each student was taught in his/her preferred way of learning (team or lecture-based learning). This might provide an explanation why some researchers found that students in a cooperative learning section in accounting performed substantially better than students in a lecture-based learning section (e.g., Ciccotello and D'Amico 1997; Hwang et al. 2008) and why other studies reported little or no improvement in students' performance when they worked in groups rather than working individually (e.g., Gabbin and Wood 2008; Lancaster and Strand 2001). It can be hypothesized that team learning is only effective if students prefer this learning method. Hence, future research might involve experiments, both preference matching and non-preference matching. *Fourth*, the results suggest that elements under the instructor's control, such as the educational setting, have the potential to influence students' academic

[8] We also asked the lecture-based learners, whether they still preferred lecture-based learning and similarly approximately 85 % answered positive.

[9] We thank the two anonymous reviewers for providing this idea.

performance in a positive way, especially for students who start with a lower ability and are willing to engage in team learning. In this sense, the current study contributes to the research on predictors of performance by investigating the relationship among several variables that accounted for the variance in examination grades, but a number of other variables (e.g., team composition or participation-level) could be included in future research.

Recommendations

It is clear from previous literature that cooperative learning in general, and team learning in particular, is considered a valuable learning technique in higher education today. Findings from this study confirms this and reveal that team learning is an effective way of promoting students learning. Many authors refer to the importance of active learning techniques. For example, the meta-analysis of Springer et al. (1999) demonstrates that various forms of small-group learning are effective in promoting performance, and increased persistence in courses and programs. However, Cooper and Robinson (2000) reported that lecture stays the prevailing teaching strategy in large classes in higher education. The extent to which active learning techniques are implemented varies by institution, faculty, and course. Several instructors have argued against implementing cooperative learning, such as team learning, because group tasks involve more class time and preparation. Therefore, it is important to consider a cost-benefits ratio in the light of massification in higher education and the growing diversity of the student population. Given that team learning had a positive outcome in our setting, one might ask whether team learning should be provided for all students. We believe that providing students *the choice* between team learning and lecture-based learning is a good solution. First, in the current setting, the number of students is large (and increasing each year), while teaching resources remain limited. Some students are willing to commit and put a lot of effort into accounting (team learners), while others want to work in an autonomous, free manner and like to hear a well-structured, comprehensive solution to the exercises (lecture-based learners). Secondly, by implementing two learning paths, students can stipulate their preferences and learn in the way they like, which can lead to increased satisfaction.

In addition, under the assumption that high ability students will learn in every way, one could ask whether team learning should only be organized for lower ability students. We believe that we need heterogonous groups to enhance student learning. Less skillful students can actively cooperate with more competent peers and thereby develop a deeper understanding of the learning material. The main findings indicate that some students may have a greater need for support and guidance and that students prefer different learning paths. This is one of the main reasons why we believe that institutions should offer students the possibility to choose between several learning methods in particular courses.

Appendix 1

See Table 7.

Table 7 Reliability measures for the MSLQ: motivation subscales

Measures and items (1 I completely disagree–7 I completely agree)	Factor loading
Value	
Intrinsic goal orientation (Cronbach's alpha = .84)	
1. In a class like this, I prefer course material that challenges me so I can learn new things[a]	.571
2. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn	.589
3. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible	.551
4. I choose to prepare assignments at home, even if I don't get credits for that[a]	.477
Task value	
1. I think I will be able to use what I learn in this course in other courses	.539
2. It is important for me to learn the course material in this class	.559
3. I am very interested in the content area of this course	.769
4. I think the course material in this class is useful for me to learn	.758
5. I like the subject matter of this course	.778
6. Understanding the subject matter of this course is important to me[a]	.711
Extrinsic goal orientation (Cronbach's alpha = .59)	
1. Getting a good grade in this class is very important for me[a]	.746
2. The most important thing for me right now is improving my overall grade- point average; so my main concern in this class is getting a good grade	.560
3. If I can, I want to get better grades in this class than I scored for the "Introductory Accounting" course[a]	X
4. I want to do well in this class because it is important to show my ability[a]	.842
Expectancy	
Control of learning beliefs (Cronbach's alpha = .66)	
1. If I study in appropriate ways, then I will be able to learn the material in this course	X
2. It is my own fault if I don't succeed for this course[a]	.751
3. If I try hard enough, then I will understand the course material	X
4. If I don't understand the course material, it is because I didn't try hard enough	.803
Self-efficacy for learning & performance (Cronbach's alpha = .93)	
1. I believe I will receive an excellent grade in this class	.754
2. I am certain I can understand the most difficult material presented in the readings for this course	.749
3. I am confident I can understand the basic concepts taught in this course	.663
4. I am confident I can understand the most complex material presented by the instructor in this course	.818
5. I am confident I can do an excellent job on the exam for this course[a]	.770
6. I expect to do well in this course	.798
7. I'm certain I can master the skills being taught in this class	.827
8. Considering the difficulty of this course, the teacher and my skills, I think I will do well in this class	.829
Affect	
Test anxiety (Cronbach's alpha = .73)	
1. When I take a test I think about how poorly I am doing compared with other students	.724
2. When I take a test I think about items on other parts of the test I can't answer	.763

Table 7 continued

Measures and items (1 I completely disagree–7 I completely agree)	Factor loading
3. When I take tests I think of the consequences of failing	.755
4. I have an uneasy, upset feeling when I take an exam	.651
5. I feel my heart beating fast when I take an exam	X

The present scales were based on the original scale of Pintrich et al. (1991), but some items were adapted based on the pilot study (marked by an asterisk) and others were omitted based on the reliability measures of the present study (marked by an X)

X = items deleted from the model, due to low factor loading (<.40) or high cross loadings (>.35)

Cronbach's alpha of Hativa and Birenbaum (2000): intrinsic goal orientation: $\alpha = .82$; extrinsic goal orientation: $\alpha = .61$; control of learning beliefs: $\alpha = .64$; self-efficacy for learning and performance: $\alpha = .86$; and test anxiety: $\alpha = .72$

[a] These items slightly differ from the original wording of Pintrich et al. (1991). The changes were made based on the results of the pilot study

Appendix 2

See Table 8.

Table 8 Reliability measures for the MSLQ: *Learning Strategies* subscales

Measures and items (1 I completely disagree–7 I completely agree)	
Cognitive learning strategies	
Rehearsal	
1. When I study for this class, I practice saying the material to myself over and over	D
2. When studying for this class, I read my class notes and the course readings over and over again	D
3. I memorize key words to remind me of important concepts in this class	D
4. I make lists of important terms for this course and memorize the lists	D
Elaboration (Cronbach's alpha = .70)	
1. When I study for this class, I pull together information from different sources, such as lectures, textbook, discussions and the online learning platform[a]	X
2. I try to relate ideas in this subject to those in other courses whenever possible	.736
3. When reading for this class, I try to relate the material to what I already know	.638
4. When I study for this course, I write brief summaries of the main ideas from the readings and my class notes[a]	X
5. I try to understand the material in this class by making connections between the readings and the concepts from the lectures	X
6. I try to apply ideas from course readings in other class activities such as lecture and discussion	.786
Organization (Cronbach's alpha = .80)	
1. When I study for this course, I outline the material to help me organize my thoughts[a]	.800
2. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.	.840
3. I make simple diagrams to help me organize course material[a]	X
4. When I study for this course, I go over my class notes and make an outline of important concepts	.842
Critical thinking (Cronbach's alpha = .77)	

Table 8 continued

Measures and items (1 I completely disagree–7 I completely agree)	
1. I often find myself questioning things I hear or read in this course to decide if I find them convincing enough	.582
2. When a theory, interpretation or conclusion is introduced in class or in the readings, I try to decide if there is good supporting evidence	.758
3. I treat the course material as a starting point and try to develop my own ideas about it	.449
4. I try to play around with ideas of my own related to what I am learning in this course	.539
5. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives	.632
Metacognitive learning strategy	
Metacognitive Self-regulation (Cronbach's alpha = .66)	
1. During class time, I often miss important points because I'm thinking of other things. (reverse scaled)	X
2. When reading for this course, I make up questions to help focus my reading	.776
3. When I become confused about something I'm reading for this class, I go back and try to figure it out.	.478
4. If course readings are difficult to understand, I change the way I study[a]	X
5. Before I study new course material thoroughly, I often skim it to see how it is organized	X
6. I ask myself questions to make sure I understand the material I have been studying in this class	.795
7. I try to change the way I study in order to fit the course requirements and the instructor's teaching style	X
8. I often find that I have been reading for this class but don't know what it was all about. (reverse scaled)	X
9. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course	X
10. When studying for this course, I try to determine which concepts I don't understand well	.478
11. When I study for this class, I set goals for myself in order to direct my activities in each study period	X
12. If I get confused taking notes in class, I make sure I sort it out afterwards	X
Resource management	
Time/Study environmental Management (Cronbach's alpha = .63)	
1. I usually study in a place where I can concentrate on my course work	.772
2. I make good use of my study time for this course	.421
3. I find it hard to stick to a study schedule. (reverse scaled)	X
4. I have a regular place set aside for studying	.844
5. I make sure that I keep up with the weekly readings and assignments for this course	X
6. I attend class regularly	X
7. I often find that I don't spend very much time on this course because of other activities. (reverse scaled)	X
8. I find rarely time to study for my courses before the study period starts[a] (reverse scaled)	X
Effort regulation (Cronbach's alpha = .75)	
1. I don't like to study for this class and I quit before I finish what I planned to do[a] (reverse scaled)	.732
2. I work hard to do well in this class even if I don't like what we are doing.	.679
3. When course work is difficult, I either give up or only study the easy parts (reverse scaled)	.756
4. Even when course materials are dull and uninteresting, I manage to keep working until I finish	.746

Table 8 continued

Measures and items (1 I completely disagree–7 I completely agree)	
Peer learning (Cronbach's alpha = .55)	
1. When studying for this course. I often try to explain the material to a classmate or friend	.722
2. I try to work with other students from this class to prepare the exercises[a]	.416
3. When studying for this course. I often set aside time to discuss course material with a group of students from the class	.575
Help seeking (Cronbach's alpha = .73)	
1. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone. (reverse scaled)	X
2. I ask the instructor, the teaching assistant or the student counseling service to clarify concepts I don't understand well[a]	.684
3. When I can't understand the material in this course, I ask another student in this class for help	.773
4. I try to identify students in this class whom I can ask for help if necessary	.781

The present scales were based on the original scale of Pintrich et al. (1991), but some items were adapted based on the pilot study (marked by an asterisk) and others were omitted based on the reliability measures of the present study (marked by X or D)

X = items deleted from the model, due to low factor loading (<.40) or high cross loadings (>.35)

D = scale deleted, because of low Cronbach's alpha ($\alpha = .43$)

Cronbach's alpha of Hativa and Birenbaum (2000): rehearsal: $\alpha = .67$; elaboration: $\alpha = .70$; organization: $\alpha = .67$; critical thinking: $\alpha = .83$; metacognitive self-regulation: $\alpha = .59$; time and study environmental management: $\alpha = .72$; effort regulation: $\alpha = .62$; peer learning: $\alpha = .55$ and help seeking: $\alpha = .59$

[a] These items slightly differ from the original wording of Pintrich et al. (1991). The changes were made based on the results of the pilot study

References

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260–267.

Anderson, J. A., & Adams, M. (1992). Acknowledging the learning styles of diverse student populations: Implications for instructional design. *New Directions for Teaching and Learning, 1992*(49), 19–33.

August, L., Hurtado, S., Wimsatt, L. A., & Dey, E. L. (2002). *Learning styles: Student preferences vs. faculty perceptions.* Paper presented at the annual forum for the Association for Institutional Research Toronto, Cananda.

Biggs, J. (1999). *Teaching for quality learning at university: What the student does*. Buckingham: Open University Press.

Braxton, J. M., Milem, J. F., & Sullivan, A. S. (2000). The influence of active learning on the college student departure process: Toward a revision of Tinto's theory. *Journal of Higher Education, 71*, 569–590.

Cabrera, A. F., Nora, A., Crissman, J. L., Terenzini, P. T., Bernal, E. M., & Pascarella, E. T. (2002). Collaborative learning: Its impact on college students' development and diversity. *Journal of College Student Development, 43*(1), 20–34.

Chang, C. Y., & Tsai, C. C. (2005). The interplay between different forms of CAI and students' preferences of learning environment in the secondary science class. *Science Education, 89*(5), 707–724.

Cho, M.-H., & Summers, J. (2012). Factor validity of the Motivated Strategies for Learning Questionnaire (MSLQ) in asynchronous online learning environments. *Journal of Interactive Learning Research, 23*(1), 5–28.

Ciccotello, C., & D'Amico, R. (1997). An empirical examination of cooperative learning and student performance in managerial accounting. *Accounting Education: A Journal of Theory, Practice and Research, 2*(1), 1–8.

Collison, E. (2000). A survey of elementary students' learning style preferences and academic success. *Contemporary Education, 71*(4), 42–48.

Cook, T., & Campbell, D. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Boston, MA: Houghton Mifflin.
Cooper, J. L., & Robinson, P. (2000). The argument for making large classes seem small. *New Directions for Teaching and Learning, 2000*(81), 5–16.
Creswell, J. W. (2003). *Research design: Qualitative, quantitative and mixed method approaches*. California: Sage Publications.
Decuyper, S., Dochy, F., & Van den Bossche, P. (2010). Grasping the dynamic complexity of team learning: An integrative model for effective team learning in organisations. *Educational Research Review, 5*(2), 111–133.
Doran, B. M., Bouillon, M. L., & Smith, C. G. (1991). Determinants of student performance in accounting principles I and II. *Issues in Accounting Education, 6*(1), 74–84.
Duchesne, I., & Nonneman, W. (1998). The demand for higher education in Belgium. *Economics of Education Review, 17*(2), 211–218.
Duncan, T. G., & McKeachie, W. (2005). The making of the motivated strategies for learning questionnaire. *Educational Psychologist, 40*(2), 117–128.
Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350–383.
Engelhard, G., & Monsaas, J. A. (1989). Academic performance, gender, and the cooperative attitudes of third, fifth, and seventh graders. *Journal of Research & Development in Education, 22*(2), 13–17.
Entwistle, N., McCune, V., & Hounsell, J. (2002). Approaches to studying and perceptions of university teaching-learning environments: Concepts, measures and preliminary findings. *Enhancing Teaching and Learning Environments in Undergraduate Courses Occasional Report.* 1, from http://www.etl.tla.ed.ac.uk/docs/etlreport1.pdf.
Felder, R. M., Felder, G. N., Mauney, M., Hamrin, C. E., & Dietz, E. J. (1995). A longitudinal study of engineering student performance and retention. III. Gender differences in student performance and attitudes. *Journal of Engineering Education, 84*(2), 151–163.
Frymier, A. B., & Shulman, G. M. (1996). The development of a learner empowerment measure. *Communication Education, 45*(3), 181.
Gabbin, A., & Wood, L. (2008). An experimental study of accounting majors' academic achievement using cooperative learning groups. *Issues in Accounting Education, 23*(3), 391–404.
Gardner, B. S., & Korth, S. J. (1998). A framework for learning to work in teams. *Journal of Education for Business, 74*(1), 28–33.
Gowri Shankar, P., & Seow, J. L. (2010). The association between accounting students' lone wolf tendencies and their perceptions, preferences and performance outcomes in team projects. *Journal of Accounting Education, 28*(2), 75–84.
Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). New Jersey: Pearson Prentice Halle.
Hativa, N., & Birenbaum, M. (2000). Who prefers what? Disciplinary differences in students' preferred approaches to teaching and learning styles. *Research in Higher Education, 41*(2), 209–236.
Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67*(1), 88–140.
Hu, S., & Kuh, G. D. (2003). Maximizing what students get out of college: Testing a learning productivity model. *Journal of College Student Development, 44*(2), 185–203.
Hu, S., & McCormick, A. C. (2012). An engagement-based student typology and its relationship to college outcomes. *Research in Higher Education, 53*(7), 738–754. doi:10.1007/s11162-012-9254-7.
Huber, G. P. (1991). Organizational learning: The contributing processes and the literatures. *Organization Science, 2*(1), 88–115.
Hwang, N. C. R., Lui, G., & Tong, M. Y. J. W. (2008). Cooperative learning in a passive learning environment: A replication and extension. *Issues in Accounting Education, 23*(1), 67–75.
Ickes, W., & Conzales, R. (1994). "Social" cognition and social cognition: From the subjective to the intersubjective. *Small Group Research, 25*(2), 294–315.
Johnson, C., & Engelhard, G. (1992). Gender, academic achievement, and preferences for cooperative, competitive, and individualistic learning among African-American adolescents. *Journal of Psychology, 126*(4), 385–392.
Johnson, D. W., & Johnson, R. T. (1989). *Cooperation and competition: Theory and research*. Edina, MN, USA: Interaction Book Company.
Johnson, D. W., & Johnson, R. T. (1994). *Leading the cooperative school*. Edina, MN: Interaction Book Company.

Johnson, D. W., Johnson, R. T., & Smith, K. A. (1991). *Cooperative learning: Increasing college faculty instructional productivity*. Washington, DC: George Washington University, School of Education and Human Development.
Johnson, D. W., Johnson, R. T., & Smith, K. (2007). The state of cooperative learning in postsecondary and professional settings. *Educational Psychology Review, 19*(1), 15–29.
Kember, D. (2009). Promoting student-centred forms of learning across an entire university. *Higher Education, 58*(1), 1–13.
Klein, J. D., & Doran, M. S. (1999). Implementing individual and small group learning structures with a computer simulation. *Educational Technology, Research and Development, 47*(1), 97–110.
Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
Kunkel, J. G., & Shafer, W. E. (1997). Effects of student team learning in undergraduate auditing courses. *Journal of Education for Business, 72*(4), 197–200.
Lammers, W. J., & Murphy, J. J. (2002). A profile of teaching techniques used in the university classroom: A descriptive profile of a US public university. *Active Learning in Higher Education, 3*(1), 54–67.
Lancaster, K., & Strand, C. (2001). Using the team-learning model in a managerial accounting class: An experiment in cooperative learning. *Issues in Accounting Education, 16*(4), 549–567.
Lewis, L. K., & Hayward, P. A. (2003). Choice-based learning: Student reactions in an undergraduate organizational communication course. *Communication Education, 52*(2), 148.
Love, E. G., Love, D. W., & Northcraft, G. B. (2010). Is the end in sight? Student regulation of in-class and extra-credit effort in response to performance feedback. *Academy of Management Learning & Education, 9*(1), 81–97.
Lundeberg, M. A., & Moch, S. D. (1995). Influence of social interaction on cognition: Connected learning in science. *The Journal of Higher Education, 66*(3), 312–335.
Matveev, A. V., & Milter, R. G. (2010). An implementation of active learning: Assessing the effectiveness of the team infomercial assignment. *Innovations in Education and Teaching International, 47*(2), 201–213.
Millis, B. J., & Cotell, P. G. (1998). *Cooperative learning for higher education faculty*. Phoenix, AZ: American Council on Education and The Oryx Press.
Mulryan-Kyne, C. (2010). Teaching large classes at college and university level: Challenges and opportunities. *Teaching in Higher Education, 15*(2), 175–185.
Onwuegbuzie, A. J., & DaRos-Voseles, D. A. (2001). The role of cooperative learning in research methodology courses: A mixed-methods analysis. *Research in the Schools, 8*(1), 61–75.
Opdecam, E., & Everaert, P. (2012). Improving student satisfaction in a first year undergraduate accounting course by team learning. *Issues in Accounting Education*, *27*(1), 53–82.
Park, C. C. (2001). Learning style preferences of Armenian, African, Hispanic, Hmong, Korean, Mexican, and Anglo students in American secondary schools. *Learning Environments Research, 4*(2), 175–191.
Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational Psychological Measurement, 53*, 801–813.
Pintrich, P. R., Smith, D. A., García, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement, 53*(3), 801–813.
Postareff, L., Lindblom-Ylänne, S., & Nevgi, A. (2008). A follow-up study of the effect of pedagogical training on teaching in higher education. *Higher Education, 56*(1), 29–43.
Ruiz, L. M., Graupera, J. L., Moreno, J. A., & Rico, I. (2010). Social preferences for learning among adolescents in secondary physical education. *Journal of Teaching in Physical Education, 29*(1), 3–20.
Schoenecker, T. S., Martell, K. D., & Michlitsch, J. F. (1997). Diversity, performance, and satisfaction in student group projects: An empirical study. *Research in Higher Education, 38*(4), 479–495.
Slavin, R. E. (1990). *Cooperative learning: Theory, research and practice*. Englewood Cliffs, NJ: Prentice-hall.
Slavin, R. E. (1991). Synthesis of research on cooperative learning. *Educational Leadership, 48*(5), 71–82.
Sonnenwald, D. H., & Li, B. (2003). Scientific collaboratories in higher education: Exploring learning style preferences and perceptions of technology. *British Journal of Educational Technology, 34*(4), 419–431.
Springer, L., Stanne, M. E., & Donovan, S. S. (1999). Effects of small-group learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis. *Review of Educational Research, 69*(1), 21–51.
Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education, 68*(6), 599–623.

Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education, 37*(1), 57–70.

Trow, M. (1999). From mass higher education to universal access: The American advantage. *Minerva, 37*(4), 303–328.

Tsai, C. C. (2000). Relationships between student scientific epistemological beliefs and perceptions of constructivist learning environments. *Educational Research, 42*(2), 193–205.

Tsai, C. C., & Chuang, S. C. (2005). The correlation between epistemological beliefs and preferences toward Internet-based learning environments. *British Journal of Educational Technology, 36*(1), 97–100.

Tsay, M., & Brady, M. (2010). A case study of cooperative learning and communication pedagogy: Does working in teams make a difference? *Journal of the Scholarship of Teaching and Learning, 10*(2), 78–89.

Tynjälä, P., Välimaa, J., & Sarja, A. (2003). Pedagogical perspectives on the relationships between higher education and working life. *Higher Education, 46*(2), 147–166.

van Boxtel, C., van der Linden, J., & Kanselaar, G. (2000). Collaborative learning tasks and the elaboration of conceptual knowledge. *Learning and Instruction, 10*(4), 311–330.

van der Laan Smith, J., & Spindle, R. (2007). The impact of group formation in a cooperative learning environment. *Journal of Accounting Education, 25*(4), 153–167.

Vasquez, B., Johnson, D. W., & Johnson, R. T. (1993). The impact of cooperative learning on the performance and retention of US Navy air traffic controller trainees. *The Journal of Social Psychology, 133*(6), 769–783.

Webb, N. M. (1989). Peer interaction and learning in small groups. *International Journal of Educational Research, 13*(1), 21–39.

Wierstra, R. F., Kanselaar, G., van der Linden, J. L., Lodewijks, H. G. L., & Vermunt, J. D. (2003). The impact of the university context on European students' learning approaches and learning environment preferences. *Higher Education, 45*(4), 503–523.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology, 25*(1), 68–81.

Yazici, H. J. (2005). A study of collaborative learning style and team learning performance. *Education+ Training, 47*(3), 216–229.