Assessment of Team-Based Learning in Computerized Accounting Course

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Team-Based Learning (TBL) is one of the learning methods that provide significant benefits in students learning process. However, several existing courses are not suitable for TBL. TBL should be adjusted according to the characteristics of a specific course. This paper presents a quantitative study on how TBL was implemented as one of the teaching alternatives in a computerized accounting course. The proposed learning method was implemented for 3 different cohorts and compared with conventional lecture and case study teaching methods. The effect of this implementation was measured by quantifying the class activity such as students' attendance and evaluating the students' final scores. The result shows that TBL had a significant effect on student's performance compared to the two other teaching methods. Furthermore, in the ANCOVA (analysis of co-variances) test, Grade Point Average (GPA) score was found to be the significant covariate that gave additional effect to students' performance which was represented by the final score in every cohort.

Keywords: team-based learning, accounting, teaching, method

INTRODUCTION

Universities in Indonesia are currently focusing their efforts on enhancing their graduate standard. Simply passing an exam is no longer appropriate as a measure of a student's success. During the learning process, students must participate actively. (Hartikainen et al., 2019; Hernández-de-Menéndez et al., 2019; Pardamean et al., 2017b, 2017a). Improved learning quality can be achieved by applying technology (Lajoie et al., 2020; Lytras et al., 2020; Pardamean & Suparyanto, 2014; Xiao et al., 2016) and developing learning

methods. The development of methods or models of learning on campus should be adopted by the lecturers to improve the quality of learning. The traditional didactic teaching method is no longer considered an effective teaching method because of its insignificant impact on students during the learning process (Meguid & Collins, 2017; Johnson & Hayes, 2016; Tobias, 1990). Effective teaching methods should make the students become active participants (Pardamean et al., 2017b). Team-Based Teaching (TBL) is one of the methods that encourage active learning (Andro & Pardamean, 2017; Yusof et al., 2012; Zhou et al., 2013). The implementation of TBL demonstrated the effects of good improvement in several previous studies and comparative studies (Pardamean et al., 2017b, 2017a, 2014). All these implementation efforts need to be analyzed to find the best model that can be used as the best practice for TBL implementation (Lie et al., 2023).

TBL is one of the most effective teaching approaches since it provides students with both conceptual and procedural information (James et al., 2019; Michaelsen & Sweet, 2008; Ozgonul et al., 2019). Students are directed to develop both individually and in a group. Before working in a group, students should be able to prepare themselves through the available reading and reference books. This method can increase the active participation of each individual in a group. As the consequence, students will try so hard to be ready before the class. Students should be able to learn independently and improve their skills through classroom discussions. The lecturer's role in TBL is limited to a facilitator who provides direction if some issues appear. Lecturers do not need to present all materials that have already been available for students to do self-learning. Instead, the lecturers can simply perform a brief evaluation and justify all misunderstandings that come up from the students. Both students and lecturers are actively involved in the learning process in TBL. Eventually, interactive learning can give more benefit for students in understanding all the materials (Meguid & Collins, 2017; Figueiredo et al., 2020; Swanson et al., 2019).

The goal of this study was to determine the most effective TBL implementation in Bina Nusantara University's Introduction to Accounting course. As part of the teaching and learning approach, TBL is supposed to have a positive impact on students' attitudes and learning styles. From classroom observations before TBL implementation, many students tend to be passive. Students become passive because they do not prepare themselves, they just come and sit in class.

To provide improvements for students, this research used some variations of several learning methods. In this course, researchers used a combination of 3 learning methods. These three learning methods are traditional lecture, TBL, and case studies. For three cohorts, the researchers changed the combination of these learning methods. This paper presents the association between the proposed combination of learning methods and students' final scores. Additional analysis is also presented to find out whether GPA and Percentage of Attendance (PoA) can be covariates that give an effect to the intergroup comparative test of the final score (FS) in each cohort. The result of this study is targeted to be adopted universally by any other educational institution. Thus, its impact can support the Sustainable Development Goals (SDG) program by providing good quality education (Griggs et al., 2013).

METHOD

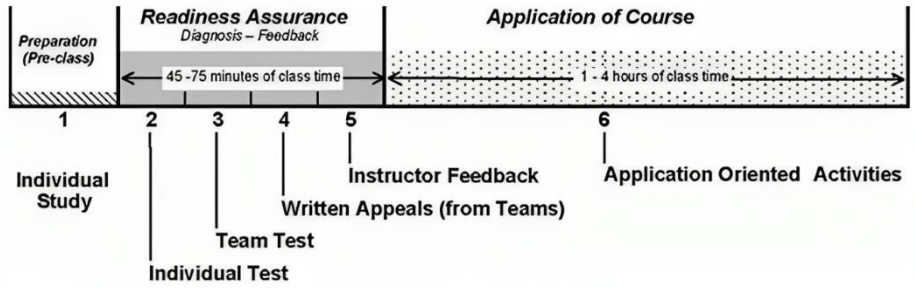
General Background of Research

Team-Based Learning is a teaching method that aims to get students actively involved in their self-study while also allowing them to practice course concepts in a problem-solving group activity. TBL is intended to provide students with time to practice their conceptual and procedural skills (Michaelsen & Sweet, 2008). Some face-to-face meetings are used in TBL to ensure that students master course content before using it for teamwork that focuses on problem-based learning by simulating complex questions that students will face throughout the course. Individual and collaborative learning are both parts of the TBL model of teaching and learning.

The TBL model was implemented in a general scheme, as shown in Figure 1. Before the face-to-face class, students must learn the assigned material for each unit. The readiness assurance process (RAP) is the first step in this level, and it consists of a short test on essential concepts from individual readings. After that, the students will work together on the test. Students need to discuss within the group to decide the

team's answer. On team tests, feedback is given immediately, allowing the lecturer to write an evaluation and argument based on direct evidence for incorrect responses. The RAP concludes with a brief and specific clarification of the common misunderstandings that occur during team tests. Following the RAP, the remainder of the learning unit focuses on in-class activities and tasks that require students to practice using course content (Michaelsen & Sweet, 2008).

FIGURE 1
TBL PROCESS



It's not easy to change students' habits and force them to apply these concepts to overcome problems (Michaelsen & Sweet, 2008). For both lecturers and students, this changing process necessitates role justification. Lecturers' primary role should shift away from simply disseminating information and toward designing and managing the entire learning process. On the other hand, the students' role must change from that of a passive receiver of knowledge to that of an active participant. This change does not happen automatically and may even seem impossible if the four important elements of TBL are not implemented properly (Goh et al., 2020; Michaelsen & Sweet, 2008). These four key elements are:

1) Teams: students must be organized and managed in groups;
2) Accountability: students must be held responsible for the quality of their individual and group work;
3) Feedback: Instructors must provide students with frequent and timely feedback;
4) Assignment design: group questions should encourage learning and teamwork (Green & de Bodisco, 2020; Michaelsen & Sweet, 2008).

Sample of Research

Overall, this research is considered a quantitative study. The data for this study came from three cohorts of Team-Based Learning deployment in Introduction to Accounting courses. This course consisted of 13 meetings. A convenience sampling technique was used in this study. It means that all of the students who registered in the Introduction to Accounting course were included in this research. The sample consists of 3 classes that formed 3 different cohorts. The total number of participants as the sample involved in this study was 180 students.

The basic concepts and principles of accounting are covered in the Introduction to Accounting course, and students will be able to use the information in the financial statement as a starting point for making decisions. This subject has 5 Learning Outcomes (LO's) (Taman Belajar, 2021):

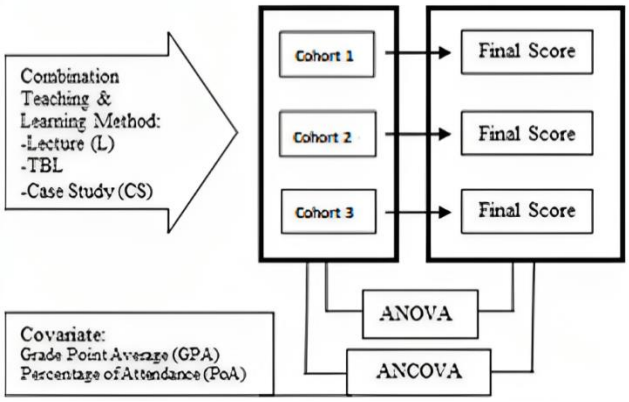
- LO 1: Explain the accounting concepts and principles as a basis in the preparation of financial statements, and the stages in the accounting cycle;
- LO 2: Explain the operations of merchandising company and the accounting cycle for a merchandising company;
- LO 3: Explain the concept and methods relating to inventories, cash, accounts receivable, plant assets, liabilities, and equity of a company;
- LO 4: Analyze the company's financial condition by using the information in the cash flow statement;

- LO 5: Analyze the information stated in the financial statement.

Data Analysis

The objective of this research was to find if the mean Final Score (FS) of the three combined methodologies used on each cohort differed significantly. The ANOVA (analysis of variances) test was used to see if the mean difference in the FS of the three cohorts was statistically significant. Additionally, classroom observations were also performed in this study. The conclusion of data analysis was formulated from ANOVA results, the combination of learning methods, and classroom observations. Moreover, analysis of covariance or ANCOVA (analysis of co-variances) test was also conducted with GPA and PoA as covariates. ANCOVA was performed to find out whether GPA and PoA would give effect to the intergroup comparative test of the FS in each cohort. Figure 2 shows a flowchart of data analysis that was used in this research.

FIGURE 2
RESEARCH MODEL AND OPERATIONALIZATION



RESULT AND DISCUSSION

Findings

Introduction to Accounting course uses teaching and learning methods combined from lectures (L), Team-Based Learning (TBL), and case studies (CS). This combination was obtained based on the assumption of the material character in Learning Outcome. The combination was also done to present a variety of learning models for students. Table 1 shows the distribution for 13 sessions (S) of lecture models and Learning Outcomes (LO) in each cohort (C).

TABLE 1
DISTRIBUTION OF TEACHING AND LEARNING MODEL

S	1	2	3	4	5	6	7	8	9	10	11	12	13
LO	**1**	**1**	**1**	**1**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**4**	**5**
C1	CS	CS	CS	CS	CS	CS	CS	CS	TBL	TBL	TBL	TBL	L
C2	TBL	TBL	TBL	TBL	CS	L	CS	CS	CS	L	L	L	L
C3	L	CS	CS	CS	L	CS	CS	TBL	TBL	L	L	L	L

As shown in Table 1, during the implementation of the first cohort (C1), TBL was performed toward the last 4 meetings after case study sessions were completed. While on the second cohort (C2), TBL was conducted at the beginning and ended with lectures before the final exam of the semester. In the third cohort

(C3), TBL was conducted in mid-semester and other sessions were dominated by case studies and conventional lectures.

The material taught in this lecture consists of 13, namely: (1) Accounting in Action; (2) Recording Process; (3) Customizing Accounts; (4) Completing the Accounting Cycle; (5) Accounting for Merchandising Operations; (6) Inventory; (7) Fraud, Internal Control, and Cash; (8) Accounts Receivable; (9) Plant Assets, Natural Resources, and Intangible Assets; (10) Obligations; (11) Corporations: Organization, Stock Transactions, Dividends, and Retained Earnings; (12) Statement of Cash Flows; and (13) Financial Statement Analysis. Each session covered the 13 materials (BINUS University Curriculum Center, 2014).

In cohort 1, lectures began with case studies concerning Accounting in Action. Lecture sessions with this method are carried out until the 8th meeting. Lecture sessions from 9 to 12 were carried out using the TBL method. The TBL technique entails teaching a variety of materials, including Plant Assets, Natural Resources, and Intangible Assets; Obligation; Corporations: Organization, Stock Transactions, Dividends, and Retained Earnings; and Statement of Cash Flows. Lectures are continued with the Lecture method at the final stage of the session (BINUS University Curriculum Center, 2014).

In contrast to cohort 1, the TBL approach was used in the initial four sessions of Cohort 2. The following materials are covered when using the TBL method including: Accounting in Action; The Recording Process; Adjusting the Accounts; Completing the Accounting Cycle. Lectures are continued with a combination of Case Studies and Lectures (BINUS University Curriculum Center, 2014).

In Cohort 3, the lecture begins with a Lecture. The TBL method began to be used at meetings 8 and 9. The materials taught using the TBL method included: Accounting for Receivables; and Plant Assets, Natural Resources, and Intangible Assets. The last four lectures were conducted using the Lecture method (BINUS University Curriculum Center, 2014).

In this trial, 9 out of 13 materials were taught using TBL. The materials include Accounting in Action; The Recording Process; Adjusting the Accounts; Completing the Accounting Cycle; Accounting for Receivables; Plant Assets, Natural Resources, and Intangible Assets; Liabilities; Corporations: Organizations, Share Transactions, Dividends, and Retained Earnings; and Statement of Cash Flows. The contents taught utilizing the TBL technique are adjusted to each material's specific qualities. The TBL technique cannot be used to teach all subjects. Lecturers must be able to choose and sort out suitable teaching methods. At the end of the lecture or the 13th meeting, all classes end with a Lecture. This is because the last lecture needs confirmation from the lecturer regarding the material for the final exam. A comprehensive understanding of lecture material will certainly improve student learning outcomes. Material regarding Accounting for Merchandising Operation; Inventories; and Fraud, Internal Control, and Cash are not suitable to be taught using the TBL method (BINUS University Curriculum Center, 2014).

Classroom observations indicated that students in cohort 2 were more enthusiastic in attending lectures than in cohort 1 and cohort 3. However, students in all cohorts indicated a declining interest in learning. Generally, after the 4th meeting on each cohort, some students were absented from the class. Lecture and case study appeared to be unattractive for students. Specifically, for a case study, most of the students have relied on smarter students in the class. While TBL, students seemed enthusiastic in working on the Readiness Assurance Test (RAT), both individuals and groups. Although in mini case that were fewer students to participate actively, but in the process of group test students enjoyed the learning process. TBL was successful in promoting student involvement in the learning process. In TBL, the framework of teaching and learning has created an environment in which students can actively participate in the learning process.

As the initial data, this study used GPA on the scale of 0 to 4 as a reference. The GPA was calculated by taking the mean of course grades obtained by the student in the exact period before taking the Introduction to Accounting course. Meanwhile, The Final Score (FS) was obtained from the processing of the average value of the task, midterm exam, and final exam. Each assessment component had the following weightings: 20% for Assignments, 30% for Mid Exam, and 50% for the Final Exam. The final range of values obtained was 0 to 100. The mean (SD) of the GPA, PoA, and FS for each cohort are shown in Table 2.

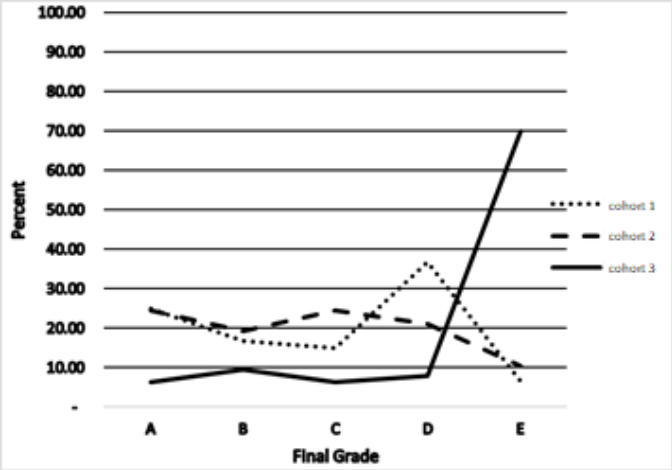
TABLE 2
MEAN (SD) OF GPA, PERCENTAGE OF ATTENDANCE, AND FINAL SCORE

Cohort	N	Mean (SD)		
		GPA	Percentage of Attendance (PoA)	Final Score (FS)
C1	60	3.02 (0.65)	93.46 (10.58)	67.40 (18.16)
C2	57	2.69 (0.50)	93.17 (10.45)	70.23 (14.71)
C3	63	2.47 (0.66)	77.57 (22.02)	51.53 (16.47)

According to Table 2, students in cohort 1 (C1) showed the best mean GPA value among these three cohorts, while the worst GPA was obtained by students from cohort 3 (C3). Similar to the PoA which was sequenced from the highest to the lowest of the PoA was cohort 1, cohort 2, and cohort 3. Whilst, the highest mean of FS was in cohort 2 (C2) with 70.23 and the lowest FS mean was in cohort 3 (C3) with 51.53.

Final Score was converted to Final Grade (FG) value in alphabetical. The conversion used the following conversion systems: A (85 - 100), B (75 - 84), C (65 - 74), D (50 - 64), and E (1- 49). Students would pass this course if they get an A, B, or C. Figure 3 shows the percentage graph of the final grade achieved by the students in each cohort.

FIGURE 3
FINAL GRADE PERCENTAGE



From Figure 3, it was clear that more students achieved A, B, and C grades than those who got a D and E grade in cohort 2. While in cohort 3, students with grade E dominated the class. Grade E in cohort 3 exceeded 50% of the class.

To complement the basic analysis, two more advanced statistical analyses were conducted to gain more insights into the data. First, the ANOVA test was performed with the SPSS application. The ANOVA was utilized to determine if there was a significant difference in the final score mean between cohorts. Table 3 shows that the mean difference in FS is significant with an F score is 22.68 with a p-value less than 0.05.

TABLE 3
ANOVA RESULT

F	Sig
22.68*	0.000

*significant *p-value* < 0.05

TABLE 4
ANCOVA RESULT

Source	F	Sig
GPA	43.95*	0.000
PoA	0.54	0.463

*significant *p-value* < 0.05

Another statistical analysis included in this study was ANCOVA. It was conducted to find out whether the covariates of GPA and PoA had an effect on comparative tests for all cohorts. Table 4 shows the ANCOVA results for this study. The results can be concluded that GPA was a covariate that has a significant influence with an F score of 43.95 with a p-value less than 0.05. On the other hand, PoA did not show a significant influence, with a p-value greater than 0.05. As a result, the difference in GPA scores between cohorts had an impact on the final score.

Discussion

In Table 2, cohort 2 had the highest mean final score of 70.23 (SD = 14.71). In this cohort, the lecture started with Team-Based Learning with Learning Outcomes 1 (see Table 1). Learning Outcome 1 requires students to explain accounting ideas and principles as a foundation for financial statement preparation, as well as the stages of the accounting cycle. The material for Learning Outcomes 1 contains basic concepts and principles in accounting. TBL was able to force students to become self-directed learners and actively prepared themselves before the class (Gleason et al., 2011; Whitley et al., 2015). By preparing themselves before class, face-to-face meetings in the classroom can run very effectively. Students come to class with initial knowledge and they could enrich their understanding from workgroup activities. Compared to cohorts 1 and 3, cohort 2 was initiated by TBL at the beginning of the lecture series. From in-class observation, TBL has been proven to give a good impact on students' attitudes, which is coherent with the study done by Mark Killian and Hara Bastas (Killian & Bastas, 2015). The implementation of TBL at the beginning of the lecture series can encourage a good initial habit of the students. This good start is potentially maintained throughout the learning process. It can be a booster for students to achieve a good score on the final exam.

Attitudes and habits were also proven to increase students' success rate on the final exam. As shown in the graph of Figure 3, the success rate in cohort 2 was much better than cohorts 1 and 3. In cohorts 1 and 3, the final score was dominated by grades D and E. Students' interactivity inside the classroom can drive the learning process to be more meaningful. Based on the class observation, students in the second cohort seemed very active in class discussions as well as in question and answer sessions. They tried to gain more understanding of the materials through the activities that exist in the face-to-face phase. This condition has not happened to students in cohorts 1 and 3. Students in these two cohorts tended to be passive. Case studies could not prevent students to do unnecessary activities such as playing around with books while in class.

Another finding in this study is the significant differences between the mean of the final score among cohorts obtained from the ANOVA test. The results of this ANOVA test indicated that the different ways of combining all teaching methods in each cohort give a significantly different effect. From Table 2, it appears that the final score means in cohort 2 is better than the others. As shown in Table 1, cohort 2 began with a TBL process, followed by a lecture on a case study. Using TBL at the beginning of the lecture is

important to increase students' interest in learning as well as students' understanding. This finding is in-line with a research accomplished by Du and Yang, which state the ability of TBL to improve students' mastery (Du & Yang, 2017). Additionally, from in-class observation, students' enthusiasm to follow the lecture was also increased. The increase in students' enthusiasm in this lecture could be seen in the presence of students in class. Students were motivated to come to class to take quizzes and tests. Students didn't want to lose scores that affect their final score. In addition, student participation in discussions also increased, because there were scores for the overall performance of students in the class discussion. Students were also ready to face class because they had prepared themselves by reading materials on the online portal. The positive impact of using TBL in the teaching and learning process could improve student learning outcomes. The assessment process in TBL made students compete to get a score in each session. These scores could affect GPA cumulatively.

The last finding was the covariates of GPA that provided an effect on comparative tests in each cohort. Table 5 shows that GPA was a covariate that boosts a significant influence on the final grade achieved by the students. These results are consistent with studies of Bacon and Bean (Bacon & Bean, 2006), and Alexander, Tedman, Wallace, and Pountney (Alexander et al., 2011) on how education can improve reviews of their studies with the appropriate use of GPA as the indicator. This outcome was also consistent with our prior research, which compared the results of Indonesian and Australian business students. The results of this study comparing Australian and Indonesian students were interesting (Pardamean et al., 2017b). The statistics revealed that the students, particularly those from Australia, had improved their academic performance considerably. GPA can be used as a baseline for measuring student intake. This means that in determining the combination of learning methods, lecturers also need to look at the distribution of GPAs from students in the classroom. In TBL, group activity plays an important role in learning, so GPA can be used as a reference in forming the groups. On the other hand, PoA did not show a significant influence on the students' final grades.

CONCLUSION

This paper presented the success of Team-Based Learning implementation in one of the courses at Bina Nusantara University. For all three different cohorts, the analysis results using ANOVA proved that TBL significantly influenced students' performance during the learning process. Additionally, ANCOVA results showed that GPA can be used as a covariate because it has a significant effect. GPA can be used as a baseline for measuring student intake. From these results, it could be concluded that in determining the combination of learning methods, lecturers also need to see the distribution of GPA from students in the class. Particularly in the usage of TBL, GPA could be used for forming groups.

Another conclusion that could be highlighted from this research was the variation or combination of teaching methods in lectures. The lecturers should be able to determine the most suitable learning methods according to the topic being taught. Each topic had different characteristics. Thus, it could not be generalized that TBL would be effective to be implemented in all courses, sometime a traditional lecture method would be more suitable to teach a particular course. Additionally, from in-class observation, students' enthusiasm to follow the lecture was also increased. Students were motivated to come to class to take quizzes and tests. Students didn't want to lose scores that affect their final score. The positive impact of using TBL in the teaching and learning process could improve student learning outcomes. The assessment process in TBL made students compete to get a score in each session. These scores could affect GPA cumulatively.

From the results of analysis and discussion, the combination of teaching-learning methods in a lecture series had an impact on student learning outcomes. Yet, many factors had not been included in this research. Factors that might be involved were gender factors, socioeconomic status, age, and other factors attached to the sample. Also, the external factors of the learning environment should be observed, such as learning media, material readiness, and completeness of supporting learning tools. The authors hope that the results of this study may provide an idea for further research and can be adapted to provide an alternative learning method. Eventually, it can provide a good quality education that supports one of the SDG programs.

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