Using Archaeology to Help Undergraduates Develop Teamwork Skills

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Abstract

Teamwork is a skill that many employers value, yet studies suggest college graduates rarely excel in this area. Since teamwork is not unique to any one discipline, it can be incorporated into nearly any type of course. We, as instructors, can provide students with multiple opportunities to practice collaborating in teams, receive peer and instructor feedback, and positively contribute to improving student competencies. Further, studies have shown that collaboration provides additional social, psychological, and academic benefits. Team-Based Learning (TBL), an evidence-based collaborative teaching strategy, is one way of incorporating collaboration and teamwork into classes. This poster presents a case study for how TBL was implemented in a high enrollment (approx. 100 students), online, general education introductory archaeology course. I will discuss the TBL process that was used (including assignment formats/timing and team formation), comparisons between implementation in a synchronous and asynchronous online class, and tips for incorporating TBL online. Additionally, I will examine student perceptions about their own skills and the course content, collected through a pre- and post- survey within the class.

Introduction

Why is teamwork important?

Although often used interchangeably, teams are different than groups. Both a team and a group work toward a common goal, but teamwork implies more interaction and cooperation among those individuals collaborating (Burke and Barron 2014). One way of describing teamwork skills is the ability to "[b]uild and maintain collaborative relationships to work effectively toward common goals, while appreciating diverse viewpoints and shared responsibilities" (NACE 2021). In a 2018 study, **78.7% of employers surveyed stated that they look for the ability to work in a team** on candidate resumes (NACE 2018). In this survey, teamwork ranked third (after written communication skills and problem-solving skills) among 20 skills and qualities valued by employers. Further, collaborative learning, which contributes to the development of strong teamwork skills, has been demonstrated to positively affect social, psychological, and academic outcomes (Laal and Ghodsi 2012). Some of these benefits are listed below.

Social Benefits
- Develops a social support system for learners
- Builds an understanding of diversity among team members

Psychological Benefits
- Increases students' self-esteem
- Cooperation reduces anxiety

Academic Benefits
- Promotes critical thinking
- Engages active learning
- Increases student motivation to learn

What is Team-Based Learning (TBL)?

TBL is a structured form of collaborative learning that emphasizes student preparation and application of knowledge (TBLC 2021a). TBL is not about learning through lecturing. Through TBL, **the student is placed into a role of greater autonomy and responsibility for their learning while the instructor serves to guide and facilitate learning.** Results from a variety of studies provide evidence that TBL supports increased knowledge retention and problem-solving skills as well as helps students integrate content into practice (both in synchronous and asynchronous settings) (TBLC 2021b). The TBL process includes: 1) individual preparation, 2) individual quiz, 3) team quiz, 4) team application exercise. TBL is an instructional strategy that can be used in any discipline.

Methods

Research Questions

1. How **does TBL affect** students' ability to collaborate?
2. Does **class format** (synchronous/asynchronous) change outcomes?

Context

- UNT is a public R1 university, located in Denton, TX.
- General education class called Archaeological Science.
- Study conducted during Fall 2020 and Spring 2021 semesters.
  - Fall 2020: **synchronous** online (T/R via Zoom), 97 students
  - Spring 2021: **asynchronous** online, 96 students

TBL process

Each week of the course considered a different topic. During each week, students completed a combination of individual and team assignments. Assignment due dates were regular and spaced across the week. These assignments included:

- **Individual Quiz** – due Tuesday (via Canvas LMS)
- **Team Quiz** – due Thursday (via Google Docs)
- **Team Lab** – due Sunday (via Google Docs)
- **Peer Feedback** – due Sunday (via TEAMMATES)

Individual and Team Quizzes consisted of the same 8 multiple choice questions (students were given the answers after the submission of the Team Quiz). The idea was to encourage students to discuss answers and argue for the one they think is correct. The Team Labs generally consisted of open-ended questions that required students to apply the material they'd learned that week. Peer Feedbacks asked students to rate how much each person contributed to team assignments as well as anonymously provide each other with closed and open-ended feedback about what each person could do to improve as a team member. In the synchronous version of this course, students were given class time to work on some of these assignments. In the asynchronous version, students determined among their team the best way to complete assignments (weekly meetings, asynchronous discussion, etc.) – this plan was recorded in a team contract at the beginning of the semester. The rotation of assignments began during the third week of classes and continued for 11 weeks (i.e., students completed 11 of each of these assignments).

Data Collection

To assess the affect the class had on teamwork skills, I considered student perspectives of themselves as well as of their peers. **For self-assessment, students were asked to complete a survey** at the beginning and end of the course (pre-test and post-test, respectively). Although other questions were asked, for the purposes of this study, 2 questions were analyzed from these surveys:

- How comfortable are you working in teams?
  - Likert scale: 1 (not at all) to 5 (very)
- How can the skills you'll practice/you've practiced in this course be applied to your future goals (academic, career, etc.)?
  - Open-ended response

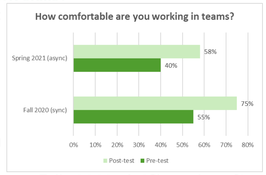
For peer assessment, students were asked to complete peer feedback at the end of each module. Each feedback session included the following 5 questions, each with a Likert scale response (1 = rarely, 4 = always):

1. How often did each person foster collaboration in terms of: flexibility, objectivity, acceptance?
2. How often did each person foster a constructive team climate?
3. How often did each person contribute positively to the group with one or more of the following: ideas, workload, energy/motivation?
4. How often was each person prepared to work with the team?
5. How often did each person respond to feedback constructively?

Results

How do students view their own teamwork skills?

Results from the pre- and post-tests suggest that **the course improved students' comfort working in teams.** The image to the right shows a bar graph with the percentage of students that answered 4 or 5 on the Likert scale question (5 = very comfortable). The bar graph shows that, although fewer Spring 2021 students entered the class being comfortable working in teams compared to Fall 2020 (40% and 55%, respectively), both groups of students demonstrate similar improvement at the end of the class (18% and 20% improvement, respectively). Here, I am assuming that there is a connection between level of comfort and level of perceived skills.



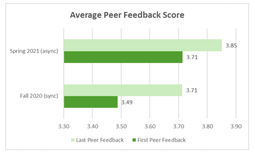
When considering the open-ended responses, I analyzed the 50 most frequently used words and phrases within each survey. The word cloud to the left shows a visual representation of the top 50 words/phrases from the Fall 2020 pre-test.

When combining "team" and "teamwork," these were the most frequently used words across pre- and post-tests in both semesters. Important to note is that each of these instances came from a distinct student (i.e., no students used team/teamwork more than once in a response). In both semesters, the percentage of students who used "team" or "teamwork" in their responses increased between pre- and post-tests. These results suggest that many students understand the importance of teamwork skills in relation to their future goals, though this importance is more apparent by the end of the semester.

Percentage of students who mentioned "team" or "teamwork" in open-ended responses.

Semester	Pre	Post
Spring 2021 (async)	51%	58%
Fall 2020 (sync)	42%	56%

How do students view their peers' teamwork skills?



Results from the Peer Feedbacks also suggest that **the course improved students' teamwork skills.** The image to the left shows a bar graph with average peer feedback scores (considering all 5 questions together), comparing the first and last Peer Feedbacks of the semester. The bar graph shows that **both groups of students improved their teamwork skills across the semester, though at different rates** (improvement of 0.14 for Spring 2021 and 0.23 for Fall 2020). Interestingly, when examining the questions individually, the most improvement in both semesters was present in the third question: How often did each person contribute positively to the group with one or more of the following: ideas, workload, energy/motivation? The Spring 2021 group improved in this skill by 0.21, while the Fall 2020 group improved by 0.41. These results suggest that, according to students' peers, this course improved students' teamwork skills, especially when considering the ability to positively contribute to the team.

Average peer feedback scores for Peer Feedback Question 3.

Semester	First	Last
Spring 2021 (async)	3.66	3.87
Fall 2020 (sync)	3.35	3.75

Conclusion

In this study, I examined the effects of TBL on students' teamwork skills in an asynchronous and synchronous online archaeology course. Student perceptions of their own and their peers' skills suggest that **teamwork skills improved during the semester.** However, **the amount of improvement appeared to be slightly larger in the synchronous online section.** Ultimately, TBL is an effective pedagogical strategy that can be applied to any class topic or modality.

Tips for Implementing TBL

1. **Give students your rationale for using TBL.**
   For example, incorporate a module or discussion about collaborative learning and its benefits. Talking to students about the way they learn helps them buy into your pedagogical strategy.
2. **Thoughtfully create teams of 5-7 students with diverse backgrounds.**
   For example, include different years, majors, genders, ages, etc. within each team where possible. Creating diverse teams with multiple perspectives helps students to collaborate with those different than themselves and supports better performance (Rock, Grant, and Grey 2016). Students should stay in the same teams for the whole semester to help with team cohesion.
3. **Guide students early in getting to know each other and planning how to collaborate effectively.**
   For example, provide an activity the first week of class that allows students to introduce themselves meaningfully. Including questions that are non-academic (e.g., How many siblings do you have?) and strategic (e.g., What kind of teammate are you?) helps students connect on a personal level and increases team cohesion. Additionally, collaboratively creating a team contract with group norms and detailed plans for completing assignments helps students manage expectations for themselves and each other, leading to greater team success and fewer issues.
4. **Help teams handle unproductive team members.**
   For example, implement a course policy that outlines when and how teams can remove a member. Having an outlet to remove "slackers" reduces stress for students who are contributing effectively. Unproductive team members is the most common complaint I've encountered from students.

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- Please feel free to contact me about this research or about TBL in general at kara.fulton@unt.edu.