

## **Work-in-Progress: A Professional Learning Community Experience in Developing Teamwork Teaching Materials**

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### Professional Learning Community

This is a work-in-progress paper describing the development of teamwork materials and lessons for an introductory industrial engineering class that is a required as part of the BS Industrial Engineering (BSIE) degree at the University of Texas at Arlington (UTA). The materials and lessons were developed as part of a Professional Learning Community (PLC) entitled: Collaborate UTA: Focus on Teamwork. The PLC was part of UTA's Quality Enhancement Plan (QEP). The central focus of UTA's current QEP is on teamwork, with the goal of innovating and re-conceptualizing teaching based on intellectual growth on this topic. Participation in the PLC included structured meetings, shared dialogue (both face to face and virtual, including a shared blog), reading and discussing a shared book, and engagement in individual research grounded in the scholarship of teaching and learning. The PLC, consisted of faculty from across campus, and culminated with members implementing, evaluating, and presenting findings of their research projects.

The BSIE degree at UTA is accredited by ABET. ABET bases their accreditation on seven student outcomes one of which is "An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives." For accreditation purposes it is necessary to show that the program assesses students abilities on this ABET outcome. While the BSIE degree provides many opportunities for students to work and be assessed in groups, there was very little instruction in how to actually be a good group member. In fact, a review of syllabi showed only three class periods in their entire IE course curriculum focused on how to make a team work effectively. The goal of this project was to get students ready for those teamwork experiences which would be assessed against the ABET teamwork outcome.

### Materials and Lessons Developed

As part of the PLC, materials and lessons on how to be a good team member were developed and delivered to a first-semester Introduction to Engineering class. Students practiced the behaviors and skills by working in a team throughout the class. This was different from other teamwork experiences in that the goal of the team was not be to complete a class project or to write a report. The goal of the team was to become a better team.

The team building activities were based on gamification of class activities. Gamification is the idea of "using game design elements in non-game contexts to motivate and increase user activity and retention." [1] Using games in education has been shown to have many positive outcomes. The outcomes that map to the desired learning objectives for this class were that games have been shown to teach higher-order thinking skills, modify behavior, and assess knowledge and performance. [2]

Students were put into teams based upon questionnaires they filled out on the first day of class. The questionnaire asked students to list a hobby, their favorite movie, their favorite pizza

toppings, and what their “walk-up” song would be if they were a baseball player. Students were put into groups where they had something in common with at least one other student in the group.

Their first activity was to figure out why they were put into a group together. This got them talking about topics that were interesting to them and made a game out of the introductions. One class evaluation, specifically mentioned this exercise. The student appreciated getting introduced to students in the class in this way.

Another teamwork activity was the moon crash analysis [3], which I learned about in the PLC. Students were given a scenario wherein their lunar landing module had crashed on the light side of the moon. They needed to trek to the rendezvous point 50 miles away. Fifteen items survived the crash, students needed to rank those items in order of importance for their trek. Students completed the exercise alone and then in a group. They then scored their individual results as well as their team results against NASA provided rankings. The team results were better than the individual results for all but one student. This demonstrated to the students that working in a team is beneficial to the results of a project. The one student, who scored better than her team, also demonstrated a really good lesson for the class. The class talked about how she should have spoken up more during the team part of the exercise and how she hurt her team by not doing so. This allowed everyone to see both the power of the team and also the importance of each individual on the team. Thank goodness for that one high scorer!

Another of the activities was an escape room type exercise. Escape rooms are physical games in which teams must solve a series of puzzles or challenges using clues, teamwork and strategy to complete all objectives. In the developed escape room, teams were given a time limit in which to successfully complete all objectives.

Students were required to complete a reflection after each team building activity. This reflection served to bring each student’s attention back to the things they learned in class about successful teamwork behaviors and skills. They were asked to reflect on their team’s performance as well as their own performance. They were also asked to come up with strategies for how their team could work together better on their next opportunity.

### Lessons Learned

Almost all of the teamwork activities were successful. Building teams based upon outside interests was especially useful for the freshman class where students did not know each other. The moon crash activity was especially successful. The exercise is now being used in the college-wide Student Success course for all entering freshman.

The escape room activity, however, was not as successful. The students found the puzzles very difficult and most teams were not able to complete the puzzles in the time limit. This was somewhat demoralizing for the students (and me.) It does say something about the critical thinking and problem solving skills of freshmen that should be explored further.

Overall, I believe focusing time on teaching students to be better team members is beneficial and worth class time. Student evaluations of the lessons indicated that their top takeaways were that conflict is to be expected and that it is actually a sign of a healthy team, that dividing up tasks

among team members is not always the best course of action, and that a lot of teamwork skills are actually individual skills that they can continue to improve in themselves.

The greatest indicator of success came late in the semester, when I assigned a non-teamwork related exercise in class. Multiple hands immediately shot-up with the same question, “Can we work on this in our teams?”

## References

- [1] S. Deterding, "From Game Design Elements to Gamefulness: Defining “Gamification”,“ in *MindTrek*, Tampere, Finland, 2011.
- [2] M. Prensky, *Digital Game-Based Learning*, St. Paul, Minnesota: Paragon House, 2007.
- [3] "NASA," [Online]. Available: [https://www.nasa.gov/pdf/166504main\\_Survival.pdf](https://www.nasa.gov/pdf/166504main_Survival.pdf). [Accessed 1 April 2019].