

One-Minute Random Presentations for Metacognition, Accountability, Peer-to-Peer Learning, Confidence, and Attendance in a Multidisciplinary Capstone Engineering Course

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Attendance at in-person capstone course sessions is important for learning and project success, however, attendance-taking methods are often administrative burdens for students and instructors. This paper introduces an attendance-taking method to address this problem and offer additional benefits. Before each weekly in-person course session, the instructor chooses a random subset of student teams. Partway through the course session, members of each chosen team do a project team update, verbally sharing four topics with the class for 15 seconds each: something you learned last week and its impact on your project; something you are proud of from last week or think that other teams would benefit from knowing; something you need help with and why; something you plan to do this week and why. Topics do not change, and students know their team may be randomly chosen, which provides motivation for before-class preparation. Benefits include simple and accurate attendance record-keeping, student reflection on successes and struggles which builds motivation and confidence, inter-team communication, and public speaking practice in a supportive environment. It has been improved based on observations and feedback, and can be improved further with additional investigation and experimentation. Student feedback suggests that some value it and some do not.

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Introduction

In a 4th-year mechanical/electrical engineering capstone course, approximately 100 students work on ~ 25 unique industry-sponsored project teams for two semesters. Team assignment is based on project needs and student interest. Students predominantly spend their time working in teams, and the entire class only meets for about half an hour each week for an in-person course update. The instructor noticed several problems that led to the development of this quality-improving attendance-taking method. First, the previous method of taking attendance (part of a student's participation grade), a one-question online quiz about the content of the course update, felt demotivational to many students if they attended class but got the question wrong. Secondly, many students had little interaction with non-teammates or knowledge of what other teams were doing, so very few students benefited from team-to-team learning or collaboration. Thirdly, the instructor found it difficult to maintain awareness of the successes and challenges each team faced. To address these problems and provide additional benefits, the instructor chose to design and implement a small intervention¹ in the form of a new attendance-taking method. The method is described as follows: Each week, the instructor chooses five teams at random, and invites each team to spend one minute (15

seconds per student response) verbally sharing four specific things with the class.

1. Something you **learned** last week and its **impact** on your project.
2. Something you are **proud** of from last week or think that **other teams would benefit from knowing**.
3. Something you need **help** with and **why**.
4. Something you **plan** to do this week and **why**.

Students who share receive attendance credit for the day, as do students whose teams are not chosen. If a team is chosen to share, and a team member does not share, that student is marked absent. After each team shares, the student audience asks one to three questions, which serves to deepen overall student engagement and learning.

Background

It is important for students to attend the weekly in-person course updates to learn about upcoming activities, give and receive feedback about previous activities, and hear timely advice from the instructor and teaching assistants. One effective way to motivate students to attend is to deliver content that they find valuable². Not all students are motivated by the same things³, so the extrinsic

motivation of attendance contributing to the course grade can increase engagement and participation for some students. Common methods of taking attendance such as student sign-in, headcount, and regular quizzes create accountability and encourage students to attend⁴. However, they do not address the instructor’s goals of improving team-to-team learning and collaboration, nor do they increase instructor understanding of team successes and challenges. The attendance method discussed in this paper is simple to implement, requires minimal administrative work, addresses these instructor goals, and provides additional benefits to students.

Description

Every week, the instructor uses random.org to choose five out of the roughly 25 teams to come to the front of the classroom and spend up to 1 minute verbally sharing four specific things with the class, 15 seconds per topic. This sharing, called “project team updates” happens roughly halfway through the 30-minute class session to break up the instructional portion of the class and to give late-arriving students the ability to participate. The agenda, which is shown at the beginning of the session, includes which teams will be sharing that day. There are typically four students per team, so each student shares their name and talks about one topic. Students know that the topics are the same every week, and they are expected to be ready to speak every week and to know which team member will speak about which topic. While the students are speaking, a slide, such as the one depicted in figure 1, is projected that shows the five teams that will be sharing these project team updates and the four topics.

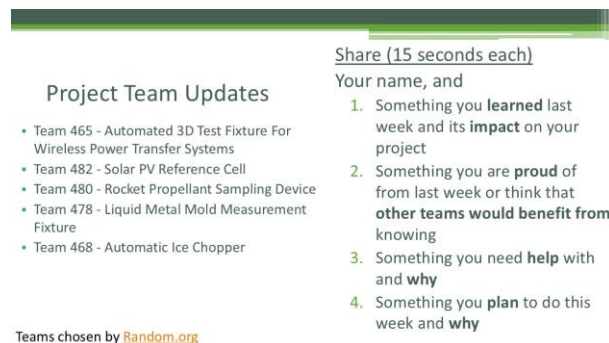


Figure 1: Slide showing the chosen teams and project team update topics

To foster student understanding and engagement, the instructor requires that after each team presents, the student audience must ask at least one question before moving on to the next team. Sometimes 5-10 seconds pass before a student asks a question, but eventually someone asks a question. The number of questions per team is limited to three so as not to take up too much time. While students share their project team updates, the

instructor writes down who from each team presents, for attendance purposes, and makes notes about items that may need instructor follow-up, such as questions, ideas, next steps, people for the students to consult with, or students who may benefit from an instructor conversation to provide clarity or support.

Besides being a simple method of taking attendance, this method is designed to have the following benefits:

- Give students practice speaking to an audience, in a supportive environment, for a short time, on a topic that they are experts.
- Help students, instructors, and teaching assistants learn one another's names. In this multidisciplinary course, students do not necessarily already know each other from previous courses.
- Force everyone to reflect on what they learned, which helps facilitate transfer of knowledge from short-term to long-term memory and improves knowledge recall⁵.
- Create short-term deadlines to help prevent procrastination⁶ because students are forced to think about and share what they are going to do soon.
- Help students recognize that they are all doing actions that lead to positive outcomes and project progress, which can strengthen self-efficacy⁷.
- Show students that everyone needs help and is expected to ask for help, which builds psychological safety to increase learning and team performance⁸.
- Bring individual student and team lessons to the entire class, so everyone can learn from them, even if they didn't have first-hand experience with them.
- Show students what other teams have accomplished and what they plan to do, which may give them ideas for what to work on.
- Share knowledge of project details, successes, and struggles, so students can help each other.
- Allow students to learn about projects that they were interested in but did not get selected for.

Outcomes

This method is in its second year of implementation, and student behavior has been observed. Both years, after the first team presented, the entire classroom erupted in applause, without the instructor initiating. This applause, which has continued every class, gives positive feedback to the presenting students, and shows everyone that the classroom is a supportive environment. The first few times, students usually remember to say their names before speaking about their project, but eventually many students forget. After a few students in a row forget, the instructor asks the class to raise their hand if they know the name of everyone in the class. Nobody raises their hand, so students can see this as evidence of the importance of saying their name before speaking about

their project. The questions that students ask after teams present generally fall into one of several categories: clarifying, requests for information or advice, or offers of assistance.

One of the most impactful lessons learned that a student shared was that when buying things for the project, it is important to pay attention to the package quantity. They shared that they needed four screws, so they ordered a quantity of four from McMaster-Carr, an industrial distributor. What they received were four boxes of 50 screws in each box, so 200 screws in total. Immediately, a student raised their hand to ask what kind of screws, and if they could have some for their project. No other teams made the same mistake, and the instructor now shares this example when introducing this method to ensure all students, even in future years, learn this lesson.

The instructor has observed that most students seem nervous the first time or two that they present to the class, but by the end of the course most students seem confident and enjoy sharing. Out of roughly 200 students over two years, there were two in the first year who were so nervous about speaking in front of class that they had physical pain and chose to not attend class. They came individually to the instructor's office to explain why they had been absent and for advice about how to overcome their fear. A discussion ensued about how to gradually build confidence by starting with speaking to an empty classroom, progressing to speaking to friends in the classroom, and continuing until they were comfortable presenting to the entire class. The instructor offered to give half credit for two months if the students wrote down their thoughts and had a team member read them. One of the two students practiced, attended a local Toastmasters⁹ event to gain experience, then showed up at a future class holding a component from their project and spoke calmly and confidently about their project. The other student decided not to attempt to get over their fear, and never presented to the class.

This method has improved through changes implemented following instructor observations and student feedback. The instructor requested student feedback through discussion during the first day of class in the second semester, and also obtained feedback through conversations and formal course evaluations. The first change was to add the audience question and answer session after each team presented to increase motivation to pay attention and to give an opportunity for the presenting team to get peer feedback. The second change was to add "and its impact on your project" or "and why" to the initial prompts to improve specificity for class understanding and to require deeper thought. The final change thus far was to show which teams are presenting on the agenda slide at the beginning of class to help students relax and pay attention, not worry about if they were going to have to present. It also created

motivation for students to arrive early so they could see the agenda that has the list of presenting teams.

A conclusive measure of this method's impact on attendance is not available because since implementation, the weekly sessions switched from online to in-person and total attendance has not been recorded, only attendance by the method described. However, available data suggests a positive impact. Attendance for the 2 years prior had means of 77% and 87% with standard deviations of 10% and 6%, and attendance since implementation had means of 98% and 99%, with standard deviations of 2% and 2%.

Student opinions about the value and impact of this method are wide-ranging and insightful. Out of 294 open-ended student responses about all aspects of the course on mid-term and final evaluations, there were 13 related to this method. Four offered criticisms and nine expressed appreciation and understanding of the value. Direct quotes are as follows:

1. I think it would be more beneficial to hear about their project and what steps the team is at in solving it.
2. Project check-ins being random make coming to class pretty stressful.
3. I do not feel like I am getting any benefit from group presentations.
4. I would prefer a simple explanation of what each team project is and their current progress.
5. I appreciate the design of having the pressure of never knowing when you are safe.
6. The 30 min meet every week is nice to get a little more insight about how other projects are going.
7. Instructor always gives people a chance to speak in front of the whole class and it has been a really good thing. It gives a space for us to practice talking in front of an audience but the way we do it makes it really easy to share. You will always get positive feedback after going up.
8. Had groups share progress in a low pressure way that cultivated community.
9. They were beneficial for the class and making an inclusive environment.
10. Required attendance at the beginning of the week encourages our group to continue meeting during that block on Wednesday and Friday.
11. Gets everyone on their toes and ready to present before lectures which passively allows people to appreciate the work they have done which is motivating.
12. Provide great practice for public speaking, plus it is always cool to hear about other groups' progress.
13. I enjoy the project updates during the lectures.

Practical Considerations and Recommendations

This method is not difficult to implement, but there are several factors that are important for it to be successful.

- The questions are the same every week, so students know what to expect and can prepare.
- A week before students present for the first time, the method is introduced. The slide depicted in figure 1 is shown as an example of what students will see while presenting. The instructor explains what will happen and what the benefits are, suggests that students prepare before class and know who is going to speak about each topic so nobody is pressured to think deeply while standing in front of the class, and gives students the opportunity to ask questions.
- The attendance policy is explained in the syllabus, which students read in class on the first day and have an opportunity to ask questions about.
- To reduce student anxiety, set clear expectations, and show how quick and simple the method is, the instructor and teaching assistants do a demonstration before the first team presents each year. The instructor and TAs plan which question they are each going to answer and exactly what they are going to say, so the demonstration goes smoothly. The examples shared are meaningful but minor, showing students that major accomplishments are not expected every week and that regularly performing small actions can lead to success.
- To ensure that every team presents a similar number of times, the instructor adjusts the random numbers if a team is selected too many times per semester.
- When students communicate concerns, questions, or ideas, the instructor listens carefully to them and offers support, explanations, and improvements.

This method takes approximately 11-16 minutes, including 1 minute for each of 5 teams, 1-2 minutes of questions, and 15 seconds of transitions between teams. Most students do not enjoy speaking in front of the class, so they generally stay within the 15-second time limit.

Before teams are formed and on the first day of class after winter break, another attendance-taking method is used. Students use an online form to answer three prompts: something you are excited about for this semester of this course, something you are nervous about for this semester of this course, and something you are confused about. These questions have similar metacognitive benefits as the project team update questions, and give the instructor valuable information to address in the next class session or with students individually.

One observed challenge is that some students speak quietly when presenting or answering questions, which makes it difficult for students in the back of the classroom

to hear and pay attention. The instructor uses a microphone so everyone can hear, and recently offered presenting students the option to use a microphone. Nobody accepted, but the offer motivated students to speak louder. A similar challenge is that sometimes not everyone can hear the question that an audience member asks. One possible solution to this challenge is to ask the presenting students to repeat the question.

Upon reflection, the instructor realized that students may not associate the prompt “something you are proud of from last week or think that other teams would benefit from knowing” with actions they chose to take, which could reduce the building of self-efficacy. Students may attribute the pride-worthy accomplishment to luck or teammates, instead of to their own hard work. Changing the prompt to “something *you did* last week that you are proud of, ...” could help students recognize their own specific actions that led to a positive outcome, to improve this prompt’s building of self-efficacy.

The author would greatly appreciate other instructors attempting this method, sharing their observations, and offering more suggestions for improvement.

References

1. Lang, J. M. (2016). *Small teaching everyday lessons from the science of learning*. Jossey-Bass/Wiley.
2. James, T., & Seary, K. (2019). Why aren't they attending class like they are supposed to? A review into students' perception of the value of class attendance. *Student Success*, 10(1), 115–129.
3. Ryan, R. M., & Deci, E. L. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *The American Psychologist*, 55(1), 68–78.
4. Miller, A. P. (2023). *Attending to student success : understanding the antecedents, realities, and consequences of absenteeism in higher education* (1st ed.). Lexington Books, pp. 38-41.
5. Weimer, M. (2013). *Learner-centered teaching : five key changes to practice* (2nd ed.). Jossey-Bass.
6. Steel, P. (2007). The Nature of Procrastination: A Meta-Analytic and Theoretical Review of Quintessential Self-Regulatory Failure. *Psychological Bulletin*, 133(1), 65–94.
7. Bandura, A. (1997). *Self-efficacy : the exercise of control*. W.H. Freeman and Company.
8. Edmondson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly*, 44(2), 350–383.
9. Toastmasters International. (n.d.). <https://www.toastmasters.org>