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# Engaging Aeronautical Science Students with Technology

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If the pandemic taught us something in academia, it was to be more flexible while leveraging creative methods in maintaining students' engagement with modern academic tools such as Nearpod. Additionally, allowing teacher autonomy supported a seamless transition to online platforms during the COVID-19 pandemic, which may translate well to a weather event without having to cancel class. Those who are researchers within the scholarship of teaching and learning community find this to be no surprise (Kahu, 2011; Ayuka & Jacobs, 2018; Keller et al., 2020). This research project examines the experience of one assistant professor of aeronautical science who implemented Nearpod into her classroom prior to COVID-19 mandates and how that was received by students before, during, and after the experience. By looking at the student evaluation data throughout this time period and one specific question asked on the end-of-course student reviews: 'What elements in this course MOST helped you learn the course content?' The research team will consider the number of responses and how many of them reference Nearpod as at least one of those elements. Additionally, the presenters will show different strategies used in aviation technical courses to integrate different tools and maintain student engagement as highlighted by students. Presenters are not associated with any of the companies that own the tools presented.

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## **Introduction**

The authors found that aviation students, specifically those who are in class with the intention of becoming professional pilots, struggle to engage in technical content without being able to engage actively in the material. Nearpod is a web-based presentation platform that allows for multiple forms of engagement in a lecture-style classroom setting. This tool was used by one of the researchers who shared it with colleagues within her department and later by the university through collaboration with this research team. However, there are other similar tools, and this just happens to be the platform used by this set of researchers.

Through the COVID-19 pandemic and multiple hurricanes, this set of researchers began to truly understand the positive impact this was having in their respective courses, primarily instrument pilot operations and aerodynamics. Between their own personal experiences and frustration with lecture-based courses and feedback from students, in addition to the increased literature surrounding technology use in the classroom, this team set out to learn more in order to leverage these tools best.

## **Literature Review Summary**

Through the literature review, it was discovered that most of the history of technology use in the classroom with published research mostly focused on “clickers” or other similar Audience Response Systems (ARS). Though this area was not heavily researched, when it was, it was commonly found within the medical professions' education system or more focused on K-12 students. There was one research project on Nearpod, specifically by McClean & Crower (2017), that utilized Nearpod in one specific module of a pharmacy and bioscience course, and it found that the significant majority of the students wanted to use Nearpod again.

Some benefits that were referenced in using ARS in any format included early alter to comprehension for the educator (Ismail et al., 2017), student buy-in to course content and engagement (McEnvoy, 2017), and improved test scores and student perception of success (Kaewunruen, 2019; Legar et al., 2020). However, no best practices or specific guidelines on how to integrate this type of technology into the classroom were discovered.

## **Research Questions & Methodology**

The research team developed a goal to address the impact of interactive content with aeronautical science students in the classroom setting, with a specific focus on Nearpod. Ultimately, we seek to develop a best-practices guide for technical education in higher education using interactive technology in the classroom. This goal led to the following three research questions:

RQ1: What is the perception of aeronautical science students on the usage of interactive technology within a technical course?

RQ2: Does using interactive technology in a technical course show an improvement in end-of-course evaluations?

RQ3: Does using interactive technology in a technical course show an improvement in students' average grades?

At the time of the presentation, the research team had only been able to analyze the data on RQ1 and did so by analyzing student feedback on course evaluations and how many times Nearpod was used in open responses.

Course evaluations from the Spring of 2020 through the Spring of 2023 were pulled for the two faculty researchers. The researchers started in the Spring of 2020 because that was the first semester in which one of the researchers began using Nearpod consistently. Further data will be pulled in order to answer RQs 2 and 3. The team analyzed data on the total students in each class, total responses for each class, the mean score of the Likert scale question, "I am satisfied with the instruction in this course," as well as a qualitative review of the open-ended questions relating to what helped the students the most, the least, and what they would change. Anytime a comment was made with regard to the presentation tool or any of the activities used within Nearpod, a note was made.

## **Results**

A total of 901 students were in the courses analyzed, and 60% of those students completed the course evaluations. When prompted, "I am satisfied with the instruction of this course," out of a possible 4.0, the mean score was 3.66, and the median was 3.68. Most (95%+) of the comments surrounding the usage of Nearpod were positive.

Students' comments support some of the literature surrounding ARS that helps with early alert to comprehension included, "extra little quizzes in Nearpod and other sites that weren't graded but helped enhance our understanding of the concepts" and "[nearpod] allowed me to be engaged as well as make the class enjoyable to learning and review." Other comments such as "definitely with other professors used this tool" and "using Nearpod really helped get the points across, instead of just sitting and looking at a PowerPoint and mothering else for 50 minutes" emphasized the benefit of the engagement feature from the student's perspective.

## **Demonstration & Brief Discussion**

During the presentation, the audience was invited to join the Nearpod, which was the presentation tool. At this point the presenters showed the "Draw It" feature using a slide from an aerodynamics course to allow participants to draw on the slide, type text, change colors, highlight, and more. Next, a pre-made Nearpod Matching activity was shared for the audience to use from the student's perspective. The presenters then shared what they saw from the teacher's view. Other features of the tool were also presented to the audience at this time that can be

adjusted during a live presentation, such as open-ended questions in which students type in their answers, how students can have the presentations sent to themselves and take notes live within the tool so they do not have to have multiple windows open. Integration into Canvas was also shared in that it can be made as an assignment or embedded into a page for further reading outside of class.

Audience members ask questions about cost, which has multiple answers depending on what scale they are looking for. More information was provided after the presentation. The screen size is another concern for a few of the audience members, as well as the research team. However, none of the questions or concerns revolve around the functionality of the tool. Rather, they are about the specific features of this unique platform.

### **Moving Forward**

The research team seeks to continue this research and answer RQs 2 and 3:

RQ2: Does using interactive technology in a technical course show an improvement in end-of-course evaluations?

RQ3: Does using interactive technology in a technical course show an improvement in students' average grades?

The goal will be to develop a best practice guide for aviation technical course educators to engage aviators in ground-based courses. The guide will aim to be comprehensive and include other interactive tools as well, though examples and data will be based on Nearpod.

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