

Preemptive Topic Exposure to Enhance Student Interactions with Potential Employers

Dustin L. Spayde, Morgan K. Green, Kirk R. Kinard

Mississippi State University, Department of Mechanical Engineering

Abstract

The Career Center at Mississippi State University (MSU) hosts the Career Expo on campus near the beginning of each semester. The Career Expo at MSU is an industry-driven recruiting event that brings together regional employers and senior-level students seeking full-time positions. This is the largest industry-based recruiting event at MSU and has a major focus on engineering majors. The volume of employers present at MSU during the fall semester Expo is significantly greater than the industry presence during the spring Expo. This difference is due to the nature of campus activities in the fall semester and the large number of alumni in industry attending the Career Expo. The Mechanical Engineering (ME) Department at MSU uses the Expo as an opportunity to acquire feedback from industry representatives about the technical abilities they seek in a new mechanical engineering hire. This feedback identified a discrepancy between industry expectations and the topics first semester seniors have exposure to prior to the fall semester Expo. Based upon this discrepancy, an assignment was developed with the intention to expose these final year students to topics prevalent in industry prior to their scheduled place in the curriculum. The ME Department's objective is to enhance the students' ability to interact with industry representatives during the fall Career Expo regarding these topics. The purpose of this investigation is to gauge the students' familiarity and comfort discussing each of the selected topics before and after the assignment. In addition, the effectiveness of the assignment at the fall Career Expo is explored.

Keywords

interview, interaction, career, employer, expo.

Introduction

Senior engineering students often balance their schoolwork with the trial of searching out careers with new employers. This process can be difficult in a crowded field of graduating engineers where you are competing with not only peers at the university level but also those who are at other higher learning institutions. Therefore, meeting employer demands for early career candidates is crucial, and the sooner a senior student can adequately speak to their readiness in every aspect desired, the better. Employers seek a complete skill set that includes both professional and technical skills in senior students. Ideally, both skill types are well developed through the coursework each student completes in their program of study. Each degree program seeks to improve how these skills are cultivated. One example comes from a national survey of political science department heads which showed a lack of timely development of job-related skills in their students. The resulting review of how the topics encountered by students in their programs is

discussed and options for improvement include reexamining the curriculum as it had historically been presented[1]. Furthermore, an Iranian study over several universities' agriculture degree offerings found students were not very confident in their employability. Students in the surveys responded with a meager confidence in their aptitude from their education and backgrounds, and reported low confidence in important skills like computer literacy[2]. For the Iranian study, students listed technical computer skills as something they were not confident in going into the workforce. Software skills are of significant importance to employers, and actions taken to instill that material into students to a greater extent can increase their marketability. Equipping students with the necessary experience and skills for employers is not a problem with a universal solution, but many universities and programs are striving to increase or improve their efforts through different approaches to prepare their students for the workplace.

One approach in improving the methods in, or the arrangement of courses in order to build the requisite skills for employment can come from analysis of the students themselves. An Australian study on business students saw an opportunity for small revision of assessment techniques that would increase the employability skills developed in students from their degree programs. The authors felt that the responsibility for improving satisfaction of both students and employers was on the coursework, and that changes to what is presented and when could be minor[3]. Multiple studies have been conducted in Canada researching the efficacy of curriculum experienced by students intending to cultivate workplace skills[4,5]. One study focused on engineering students found that the presentation of curricula as it existed at the time did not adequately prepare students for all career types from a skills standpoint. Approaches to improve the students' skill levels were discussed, and several did not require significant changes to curriculum[5]. Each survey revealed aspects in a department or university program that could be improved based on input from students. Changing the curriculum sometimes can be the best and most direct course of action; however, there can exist a mere misalignment of material present in the curriculum and the timeframe during which students are most likely to engage with potential employers. Even if projects developing the talents and skills employers want are in place within the curriculum, if they do not appear at an appropriate time for seniors seeking careers, their job hunt may become more difficult. This discrepancy in an engineering student's educational timeline could be improved through implementation of a small yet broadly comprehensive introduction before a more thorough covering of the topic occurs in upcoming coursework. When designed effectively, such an introduction could greatly improve the employability of engineering students without placing more work on an engineering instructor. Altering the point at which students encounter certain topics in their final semesters may give them better leverage in talks with potential employers.

Motivating Scenario

The Career Center at Mississippi State University (MSU) hosts the Career Expo on campus near the beginning of each semester. The Career Expo at MSU is an industry-driven recruiting event that brings together regional employers with senior-level students seeking full-time positions and underclass students seeking co-op and internship positions. This expo is the largest industry-based recruiting event at MSU and has a major focus on engineering majors. In recent years the demand for engineering majors at the event has grown tremendously. Previously, the Career Expo was split

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into two specialized days. One day was dedicated to engineering while the second day was for all other majors. As the demand for more engineering graduates increased the Career Center was forced to combine all days of the event due to the engineering recruitment spilling over into the non-engineering day. The Fall 2019 Career Expo saw over 200 companies in attendance across both days of the fair.

Companies attending the Career Expo set up booths inside the main concourse of MSU's Humphrey Colosseum. After registering, a student has open access to every company present in the expo. This gives the student the ability to speak with any present company representative about the possibility of employment. These company representatives are from a variety of positions including engineers, engineering managers, and human resource managers, among others. The open nature, combined with the variety of different hiring and interviewing methods companies utilize, results in multiple potential outcomes for a student who performs well at the expo. Some companies have a rigorous application process and are simply at the expo to encourage high performing students to apply. Contrastingly, others schedule on-campus formal interviews with students in the days following the expo. This interview can lead to further on-site interviews or possibly straight to a job offer. The ease of access to potential employers coupled with the speed that many companies move through their interview process makes the Career Expo an extremely important event for many of our students.

As well as the increased interest in engineering majors, the time of year also has a notable impact on the number of companies attending the expo. Typically, the fall semester expo sees higher company attendance than the spring semester. This is due to a variety of factors. Gauging from attendee feedback, many companies only attend once per year due to various internal reasons. However, most company representatives are MSU alumni or have a strong affiliation with MSU. These relations result in many representatives choosing to attend in fall semester, when feasible, in order to coincide with other on-campus activities, such as a home football game. The 2018-2019 academic year saw over a 20% decrease in the number of companies registered for the spring expo compared to the fall. This discrepancy leads to the fall expo being the largest recruiting event on campus and is perceived by many of our students as a must attend event during their first semester of senior year. This coupled with how early the expo occurs in the semester results in students attending and interviewing with nearly a full academic year remaining in their coursework.

The ME Department at MSU also uses the Career Expo as an opportunity to acquire feedback from industry engineering representatives about the technical abilities and professional skills they seek in a new mechanical engineering hire. This feedback is collected by engineering faculty briefly interviewing many of the mechanical engineering representatives at the expo. This method represents one of several the ME Department utilizes to evaluate and evolve our undergraduate program. The industry response in these interviews has been very insightful and encouraging. In reviewing this information as well as senior student feedback, discrepancies between industry expectations and the topics first semester seniors have exposure to prior to the fall semester expo were identified. Specifically, Geometric Dimensioning and Tolerancing (GD&T), Finite Element Analysis (FEA), and Programmable Logic Controllers (PLC) are all topics introduced in the final year of the ME curriculum at MSU. The Career Expo's placement at the beginning of the semester results in several first semester senior students, seeking full-time employment, who are unfamiliar with these technical topics during their interactions at the fall semester expo.

Methodology

Upon identifying this timing discrepancy, a bonus assignment was developed for a course typically taken by second semester juniors or first semester seniors. The purpose of the assignment was to direct students to self-explore the three identified topics and to practice speaking on each topic. This was accomplished by assigning students to perform an informal 15-minute presentation into their computer webcam. Each of the three topics was required to be discussed for at least five minutes with specific subtopics also being mandatory. The assignment was given early in the fall semester and was due the day before the fall Career Expo. Students submitted their presentations online through the Canvas Studio tool.

After the expo was completed an anonymous survey was administered to all the students in the course. The intention of the survey was to gauge student feedback on the usefulness of the assignment. The survey itself had multiple branching question sets based on whether the student completed the bonus assignment and/or attended the fall 2019 Career Expo. Table 1 shows the questions which were given to all students.

Table 1: Questions to all students

Question Statement	Possible Answers
Did you complete the bonus assignment?	Yes/No
Did you attend the Fall 2019 Career Expo?	Yes/No
Rate your experience with GD&T prior to the Fall 2019 semester.	0: No Experience 10: Very Experienced
Rate your experience with FEA prior to the Fall 2019 semester.	0: No Experience 10: Very Experienced
Rate your experience with PLC prior to the Fall 2019 semester.	0: No Experience 10: Very Experienced
How confident would you rate yourself in discussing GD&T in a professional interview setting before the Fall 2019 semester?	0: No Confidence 10: Very Confident
How confident would you rate yourself in discussing FEA in a professional interview setting before the Fall 2019 semester?	0: No Confidence 10: Very Confident
How confident would you rate yourself in discussing PLC in a professional interview setting before the Fall 2019 semester?	0: No Confidence 10: Very Confident

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Next, Table 2 shows the questions asked if the students completed the bonus assignment.

Table 2: Questions to students that completed the assignment

Question Statement	Possible Answers
Rate your experience with GD&T after completing the bonus assignment.	0: No Experience 10: Very Experienced
Rate your experience with FEA after completing the bonus assignment.	0: No Experience 10: Very Experienced
Rate your experience with PLC after completing the bonus assignment.	0: No Experience 10: Very Experienced
How confident would you rate yourself in discussing GD&T in a professional interview setting after completing the bonus assignment?	0: No Confidence 10: Very Confident
How confident would you rate yourself in discussing FEA in a professional interview setting after completing the bonus assignment?	0: No Confidence 10: Very Confident
How confident would you rate yourself in discussing PLC in a professional interview setting after completing the bonus assignment?	0: No Confidence 10: Very Confident

Subsequently, Table 3 shows the remaining questions asked if the student attended the fall 2019 Career Expo.

Table 3: Question to students that attended the Fall 2019 Career Expo

Students Asked	Question Statement	Possible Answers
Attended	I encountered the topics covered in the assignment during my interactions at the Fall 2019 Career Expo	Yes/No
Attended & Completed Bonus	I used information I covered in the assignment during my interactions at the Fall 2019 Career Expo	Yes/No

Finally, all students were asked to share any comments they had about the bonus assignment.

Results

The survey results had 80 total respondents. The breakdown of which students did or did not complete the bonus and did or not attend the Career Expo is show in Figure 1.

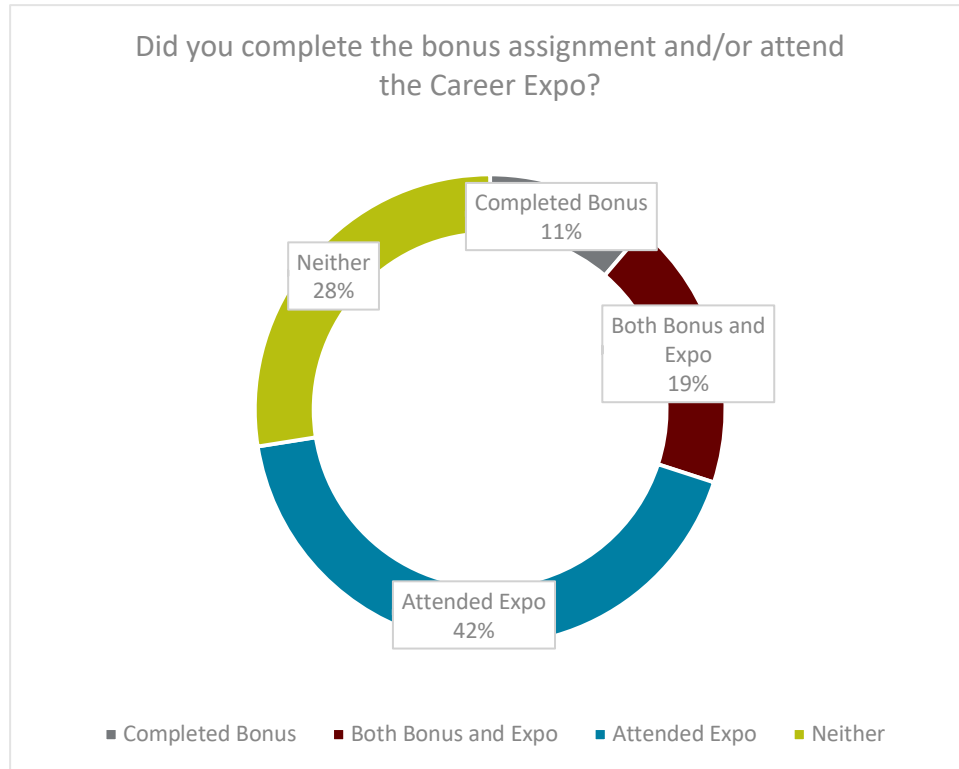


Figure 1: Bonus Assignment and Career Expo Percentages

Overall, 30% of students completed the bonus assignment, and 61% of students attended the Career Expo.

Responses showed that of the students that attended the Career Expo, 24% of them encountered the topics covered in the bonus assignment. Further investigation showed that of those who encountered the topics, about half of the students completed the bonus assignment and half did not. This result suggests that the Baader-Mein Hof phenomenon is most likely not responsible for the rate of encounters. The Baader-Mein Hof phenomenon, or frequency illusion, occurs when one's brain starts recognizing a certain object, phrase, etc. more often after initially learning about it (i.e. someone learns about a car brand and then starts seeing that type of car everywhere). Based on the data, learning more about the topics in the bonus assignment did not make the students' brains spot them during conversations at the Career Expo much more frequently than students who did not learn more about the topics (as a result of not completing the bonus assignment). This data is helpful in communicating to students the importance of learning about these topics as they may encounter them during a Career Expo conversation. However, this theory should be investigated further with a larger sample size. The percentage breakdown of these results is show below in Figure 2.

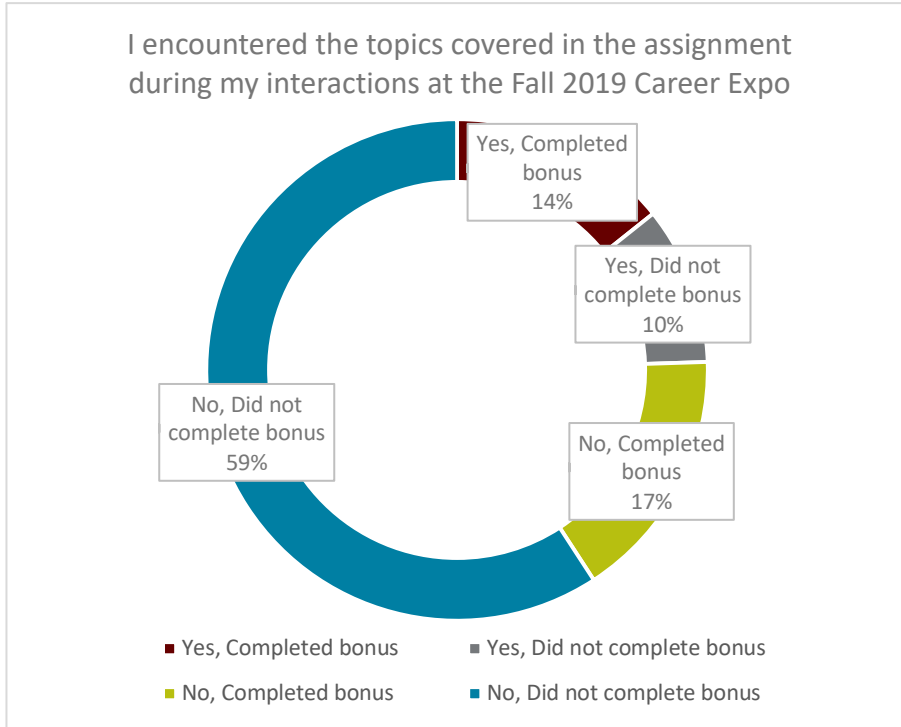


Figure 2: Distribution of Topic Encounters at Career Expo

The results to the question “I used information I covered in the assignment during my interactions at the Fall 2019 Career Expo” are shown below in Figure 3.

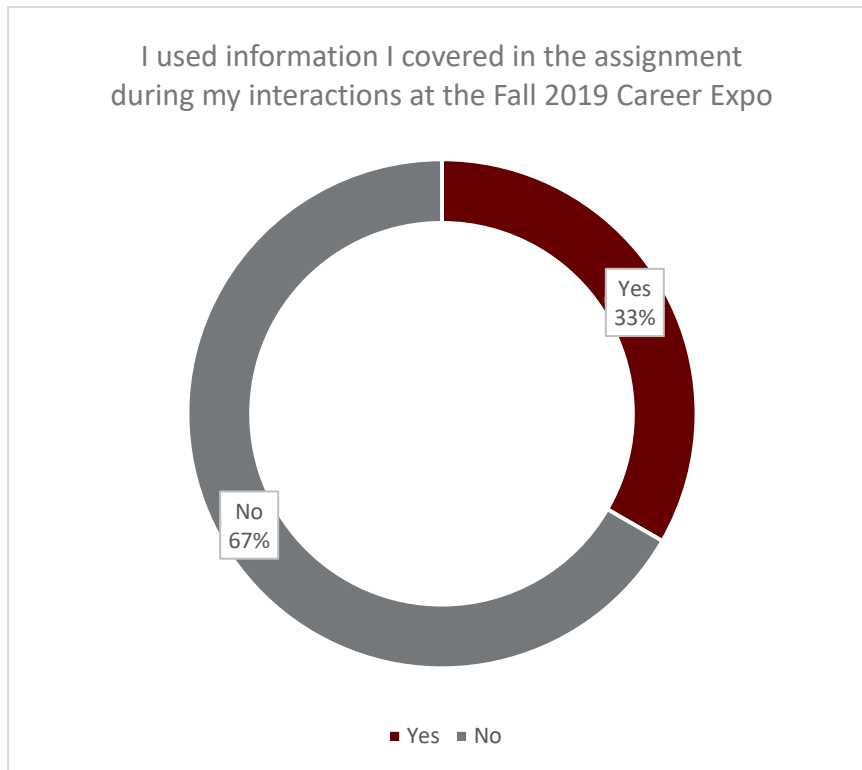


Figure 3: Breakdown of Use of Bonus Topics in Conversations

Of the students who completed the bonus assignment, the percentage of those who used the material in their conversations is comparable to the percentage of students who encountered any of the topics in their conversations. This was expected, but the question was asked to see if students attempted to utilize the information in conversation without naturally encountering it.

On average for the students that completed the bonus assignment, there was an increase in both experience and confidence with all three topics. The average responses for each question are shown below in Figure 4.

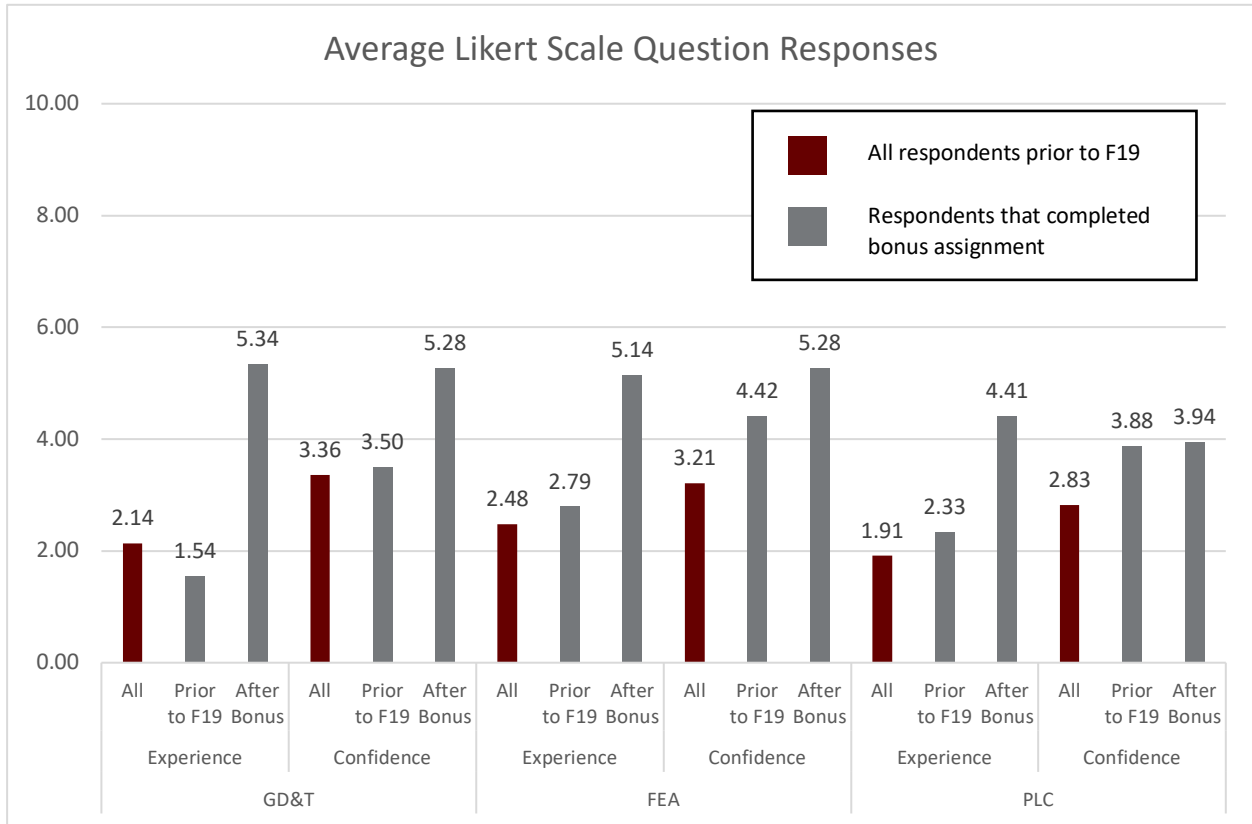


Figure 4: Likert Scale Responses for Perceived Topic Ability

For every topic the average initial experience level is lower than the perceived confidence in discussing the topic. Even though the students may have had low experience with the topics, they at least felt slightly confident in their ability to discuss them. Each topic saw an increase in both experience and confidence after the students completed the bonus assignment. The averages for the PLC questions are usually the lowest values. This is attributed to the fact that out of the three topics, students are exposed to PLC the least amount prior to their senior year. Typically, any experience a student may have with PLC before their senior year, would come through a specific co-op rotation.

Overall, the results of the survey show that students are encountering specific topics such as GD&T, FEA, and PLC in their conversations with company representatives at the Career Expo.

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Numerous students left comments, many of which were beneficial feedback for the usefulness of the assignment and show that students are encountering the topics at the Career Expo. Comments of interest are displayed in Table 4 below as well as indication of whether or not the student completed the bonus assignment.

Table 4: Student Comments

Bonus?	Feedback
Yes	Learned a lot of information about the topics covered but did not encounter them during the career fair.
Yes	The assignment covered many areas of interest for different companies. I believe it was helpful.
Yes	I used the FEA information during an interview with ExxonMobil
No	I didn't encounter any questions with it during the expo, but I feel this knowledge could be beneficial during interviews
No	Even though I did not complete the project, I still looked up information about the project topics...however the basic information I looked up and read was very helpful the few times I encounter PLC topics
No	I had many conversations about FEA. I had researched it before the career fair and felt confident taking about my knowledge with it and how I plan to learn more.
No	I did not complete the assignment, but the knowledge I gained from researching the topics made me much more confident as I approached companies at the career fair. The assignment was beneficial regardless of the fact that I didn't turn in the video.
No	I talked about GD&T with companies like Honda, Raytheon, and Incalls Shipbuilding. I had some knowledge of GD&T due to a previous co-op.

Conclusion

While the importance of preparing students with the professional and technical skills demanded by employers is well established, the results of this study demonstrate that the timing of initial topic exposure can have an impact on a student's interactions with potential employers. The student feedback verifies that most students in the ME curriculum at MSU have had little exposure to the topics identified by the industry feedback interviews at the time most students begin pursuing full-time positions. The results also verify that the topics in question are encountered by our students during their interactions at the Career Expo. While nearly 25% of students reported encountering the topics, it is important to note the results do not account for the number of instances the topics were encountered nor does it account for students speaking to non-technical company representatives. Students also reported the assignment itself has increased their confidence discussing the each of identified topics in a professional interview setting. Finally, the student comments gave some very encouraging insight to student's thoughts on the assignment. This is especially true of the students that chose to study the given topics even though they did not submit the assignment. Moving forward, the department will explore additional methods which can be easily implemented to improve student interactions with potential employers.

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Dustin L. Spayde

Dustin Spayde is an instructor in the Mechanical Engineering Department at Mississippi State University. He obtained his M.S. in Mechanical Engineering from Mississippi State University in 2013. He has a high interest in undergraduate education and focuses on laboratory-based curriculum courses.

Morgan K. Green

Morgan Green is an Instructor in the Mechanical Engineering Department at Mississippi State University. She obtained her B.S. and M.S. in Mechanical Engineering from Mississippi State University in 2017 and 2019, respectively and is currently pursuing a PhD in Engineering Education. Her research is in the development and assessment of professional skills in engineering students, K-12 outreach, and hands-on learning.

Kirk R. Kinard

Kirk Kinard is a master's student in the Mechanical Engineering Department at Mississippi State University. He graduated with his B.S. in Mechanical Engineering from Mississippi State University in 2018. His work in his graduate program is focused on development of undergraduate laboratory education.