Chemical Engineering Alumni Student Mentoring Program

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Abstract

In 2021, the Ralph E. Martin Department of Chemical Engineering at the University of Arkansas initiated a student mentoring program of departmental alumni mentors that emphasized career path identification and professional development. A total of 58 sophomores, juniors and seniors participated in the program along with 36 alumni mentors from the Arkansas Academy of Chemical Engineers and other young alumni. Twelve circles were formed, with each circle containing three mentors and 4-6 students. Five mentoring events were held in the Fall 2021 semester and three additional events were held in the Spring 2022 semester plus the final in-person celebration event in April. Through participation in the mentoring program, the students elevated their understanding of career opportunities, career expectations and communication skills to better prepare them for future employment or graduate school. As a side benefit, six of the students obtained an internship or permanent job through this interaction with the mentors. The mentors, and most particularly the younger alumni, were able to strengthen their connection with the Chemical Engineering Department and its students, giving them a real opportunity to give back to the university. Several mentors commented that they wished this program existed when they were students.

Keywords

student mentoring, alumni interactions, personal relationships, communication, career skills

Introduction

As faculty, we are all very familiar with student advising. Faculty help students plan their class schedules, give advice on how students might improve their grades or whether they should repeat a class, and help students make decisions about internships, permanent employment or graduate school. On the other hand, mentors share important expertise in helping students succeed but also seek to develop a personal relationship with the student, with the relationship often lasting for many years [1]. Mentoring is seen in many forms in the academic community including faculty providing graduate students with practical teaching experience [2], postdoctoral and graduate student mentors providing research expertise to undergraduates [3] and university and community groups working with international graduate students to improve English proficiency [4]. Mentoring is far from easy, but dedicated and knowledgeable mentors can make a real impact in the lives of students.

The Ralph E. Martin Department of Chemical Engineering at the University of Arkansas (UA) initiated a student mentoring program of departmental alumni mentors that emphasized career path identification and professional development. The program fit alumni mentors together with students in small mentoring circles that was patterned after a similar successful program in the Industrial Engineering Department at the UA [5] and several successful mentor programs in industry. The mentoring program was launched in the summer of 2021 and rolled out for the 2021-2022 school year. The purpose of this paper is to share information on the organization, operation, mentor/student evaluation of the program and to present the future plans for the program.

Getting Started

After discussing the idea of a mentoring program with representatives from Industrial Engineering and the outgoing president of the Arkansas Academy of Chemical Engineers (Academy) in May 2021, a Steering Committee (the authors of this paper) was formed and began to mold the program. A Mentoring Program Handbook was prepared as a guide for the program in early June, relying heavily on the Industrial Engineering handbook as a model [5]. The Steering Committee wanted a controlled program to ensure first year success and decided to focus the program on chemical engineering juniors for the 2021-22 year. Mentor and student application forms were prepared to obtain individual preferences and program expectations in order to better pair mentors and students in the circles.

In mid-July, mentor invitations were submitted to members of the Academy (distinguished alumni that had graduated more than 20 years ago) and 32 selected younger alumni. In the view of the Steering Committee, a good blend of younger and older alumni would be optimal for each mentoring circle. Ten Academy mentors and 26 younger alumni accepted the invitation and 12 mentoring circles were formed. Some consideration was given to forming mentoring circles around expertise in certain technical or nontechnical areas but, in the end, it was decided to have a blend of expertise and experience in each circle.

In late August (and soon after school started), the student application process was opened to chemical engineering juniors. To ensure students were aware of the opportunity, faculty authors promoted the program in the junior classes. Student responses were not great enough to fill all 12 circles, so the application process was expanded to include sophomores and seniors. Note that the freshman class was not considered for the program because the UA engineering program does not allow selection of an engineering discipline until the second semester of the freshman year. Applications were received from 15 sophomores, 29 juniors and 11 seniors. In populating the mentoring circles, each circle had three mentors (10 of the 12 circles had an Academy member) and 4-6 students. Students were sorted by class yielding four sophomore mentoring circles, six junior circles and two senior circles.

Let the Mentoring Begin

Kick-off Event

The Mentoring Kick-off Event occurred on September 20 and lasted about two hours. Kick-off expenses (primarily food) were paid by the Academy, and the Academy also agreed to pay for additional expenses throughout the school year. Since the presence of COVID was still very real and some mentors had to travel long distances to get to the UA, the event format was a combination of an in-person and virtual meeting through Zoom. All 36 mentors attended, with 50% in-person and 50% virtual. Of the 55 students participating in the program at that time (some added or dropped later), 48 attended in person, one attended virtually and six did not attend. Figure 1 shows a photograph of a group meeting of the mentors and students at the Kick-off, which was held in the College of Engineering Honors Lounge to support a more formal, professional atmosphere.

Figure 1. Mentors and Students in a Group Meeting at the Fall Kick-off

The Kick-off was an opportunity for the mentors and students to get to know each other, do some initial mentoring and plan the focus and meeting times for activities for the balance of the semester. The Kick-off included a breakout session to allow the circles to have individual in-person/virtual meetings with the entire circle, including those who could not attend in person. At least two additional circle events were scheduled to occur during the fall semester, with the circles determining when and how often to meet. Since some of the mentors regularly participate in mentoring activities as part of their jobs, a package of useful tips and discussion activities was prepared and distributed to the mentors for talking points to guide the discussion with the students and to establish agendas for the circles. While the program had an overarching theme, each circle's agenda was defined and implemented by the circle members

Fall 2021 Mentoring

Mentoring occurred throughout the fall semester, with accommodations made for both virtual and in-person attendance. The topics for discussion in the sophomore mentoring circles most often centered on obtaining co-ops and internships and the dos and don'ts of interviewing. The topics for discussion in the junior and senior groups focused on similar topics, but also dealt with permanent employment, selecting a job, day-to-day activities on the job, personality traits and conflict and effective communication. There was a consistent desire from the students to discuss communication in the professional world. The mentors overwhelmingly supported communication: while a strong technical background is important for an engineer, all forms of communication are critical for professional and personal success. To promote self-introspection and awareness, some of the circles utilized personality evaluations, such as the Myers-Briggs Type Indicator (MBTI) in their mentoring sessions. Some circles chose to have just two additional mentoring events (beyond the Kick-off), while some circles had as many as five events in the fall semester. As previously noted, the mentors were represented by a broad cross-section of UA alumni located across the country, so most interactions were virtual. However, some circles took advantage of personal interaction through in-person meetings on-campus. Figure 2 shows a photograph of a mentoring circle meeting over coffee.

Table 1 shows a summary of the mentor and student attendance at the fall events. Most of the mentoring groups decided to have four events during the fall semester. Mentor attendance was strong for these events, but virtual attendance was the norm after the kick-off event. Student attendance was good but decreased a bit with each subsequent event. A majority of the students also attended virtually, most likely because many of the mentors chose to attend virtually due to travel requirements. One of the positive results of COVID was the emergence and successful application of technology for remote interaction. This was reflected in the interaction of mentors and students. The overall student attendance in the program actually increased during Events 1-3 as a few students were added to the program while fewer dropped from the program.

Figure 2. Team Zeta Meeting Over Coffee

Table 1. Mentor and Student Attendance at Fall 2021 Events

	Fall Mentoring Event Attendance				
	Kick-off	Event 2	Event 3	Event 4	Event 5
Mentors					
Attended in-person	18	3	4	0	0
Attended virtually	18	31	24	26	6
Did not attend	0	2	8	4	0
Total	36	36	36	30	6
Students					
Attended in-person	48	5	12	0	0
Attended virtually	1	42	31	31	11
Did not attend	6	10	16	18	1
Total	55	57	59	49	12

Mentors and students were asked to complete a survey at the end of the fall semester to determine the level of satisfaction with the program and to solicit suggestions for improvement. The mentor survey had 16 questions and 18 of the 36 mentors participated in the survey. The student survey had ten questions and 42 of the 61 students participated. Overall, the mentors said that they were quite satisfied with the program and meeting frequency, they wished to continue participating in the program in the future and will recommend participation in the mentoring program to other alumni. They felt that communication from the students could be better and had difficulty with meaningful participation from some students. Some mentors also felt that the time commitment to the mentoring program was too high in combination with their jobs and extracurricular activities. In general, the students said they were quite satisfied with the program, the meeting frequency and their mentors. They were interested in participating in a

large group event or perhaps a combination of circles for some meetings and would like a chance to mix with more of the mentors to hear a broader perspective.

Spring 2022 Mentoring

The initial idea for the mentoring program was to respect the students' busy spring schedule and have a broad program event early in the Spring 2022 semester. The initial goal was to provide a broader exposure to the students of other mentors and topics, as well as provide a celebration of the fall mentoring activities. With COVID variant omicron peaking in early 2022, the ability to have a large group gathering on campus coupled with the inability of mentors to travel for personal or professional reasons led the Steering Committee to cancel the February 2022 in-person meeting. The spring program was made flexible to allow for the COVID developments. However, interest in mentoring remained high among the students, and it was decided to continue with mentoring circles and add events on special topics of interest to the entire group of students. Two pod meetings were scheduled virtually where selected mentors presented topics in their fields of expertise and of interest to the entire mentoring group:

- On March 14, Teni Butler of Eastman Chemical in Kingsport, Tennessee, and a mentor from Team Mu made a presentation on ESG and Sustainability (food, water and air)
- Also on March 14, Megan Dunn of Cardinal Health in Dallas, Texas, and a mentor from Team Eta, and Colin Paul of Thermo Fisher Scientific in Frederick, Maryland, and a member of Team Alpha, made a presentation on Graduate School Success
- One March 16, Jeremiah Born of Westlake Chemical in Longview, Texas, and a member of Team Beta made a presentation on Work Culture, Etiquette, Communications and Social Styles
- Also on March 16, Lindsay Sabey of L'Oreal in Little Rock, Arkansas, and a member of Team Theta made a presentation on Problem Solving and Change Management in the Workplace

The final event for the school year was held in-person on April 11 as a celebration of the mentoring program and a look toward the future. Dr. Kim Needy, Dean of the College of Engineering, spoke to the group about the importance of mentoring and the mentoring that she has provided and received during her career in industry and academia.

Table 2 shows a summary of mentor and student attendance at the Spring 2022 mentoring circle events. Nine of the 12 circles held a mentoring session in February (Event 1), while only three of the circles held a second session and only one circle held a third session. The pod meetings described above were a great idea, but student attendance was very low, most likely because of the busyness of the semester. The final event on April 11 was held in-person only to remove the difficulties of remote participation in a large setting and to make it personal since the year was defined by remote interaction.

Table 2. Mentor and Student Attendance at Spring 2022 Events

	Spring Mentoring Event Attendance		
	Event 1	Event 2	Event 3
Mentors			
Attended in-person	0	0	0
Attended virtually	24	7	2

Did not attend	3	2	1
Total	27	9	3
Students			
Attended in-person	0	0	0
Attended virtually	31	11	3
Did not attend	14	5	1
Total	45	16	4

As part of the spring event in April, the attending students were given the opportunity to talk about the benefits of the program and what they gained as participants. The response was overwhelmingly positive, especially considering their responses were extemporaneous. At the conclusion of the school year, the mentors and students were again asked to complete a survey to determine the level of satisfaction with the program and to solicit suggestions for improvement. This time, both the mentor and student surveys were simplified to ten similar questions to obtain better participation and have commonality of the questions between mentors and students. Participation was very good, with 51 of 58 (88%) of the students and 32 of 36 (89%) of the mentors participating. Table 3 shows a comparison of the survey results from the mentors and students on survey questions not requiring a written response. Overall, students and mentors were satisfied with the program. The student responses were 84% *very* or *somewhat satisfied*, but the mentors were a bit more satisfied with 100% of responses indicating *very* or *somewhat satisfied*. As in the Fall 2021 survey, the mentors thought that the students needed help with their communication skills. Students and mentors felt that the number of mentoring sessions was about right, the topics that were discussed were helpful, they would recommend the program to their peers and were happy that they participated. The students said they were a bit less likely to participate in the program again, largely because they were unsure of how the program would differ if they participated a second year.

In critiquing the program, the mentors and students would have preferred more one-on-one time in their circles, more targeted topics for seniors and more structure in the mentoring events. The students would also have liked more discussion with the mentors instead of one-way communication; the sessions came across as more presentation than conversation. This might have been a result of the mentoring sessions being virtual. In-person mentoring sessions generally had a more balanced discussion. Additionally, the students wanted more connection to mentors in specific fields, an option to switch circles and more casual in-person events. The mentors would have liked more student responsiveness and perhaps access to a resource library. The program did have resources available such as long-distance communications, planning, recommended activities and mentoring tips. A lesson learned from the feedback was that better communication of available tools and dissemination of resources is needed in future years.

Table 3. Summary of Student and Mentor Final Survey Results

How satisfied were you with the overall Mentoring Program?	Total Responses	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Very dissatisfied
Mentors	32	17	15	0	0	0
Students	51	27	16	5	3	0
The number of sessions was:	Total Responses	Too frequent		About right		Not enough
Mentors	32	4		26		2
Students	51	1		43		**7**
How well did your students (mentors communicate?	Total Responses	Very well	Well	Neutral	Not so well	Poorly
Mentors	32	1	15	7	9	0
Students	51	32	10	5	4	0
How helpful were the topics that were discussed?	Total Responses	Very helpful	Somewhat helpful	Neutral	Somewhat unhelpful	Very unhelpf
Mentors	32	19	12	1	0	0
Students	51	26	18	6	1	0
How likely are you to recommend the Program to another alumnus (student)?	Total Responses	Likely		Neutral		Unlikely
Mentors	32	30		2		0
Students	51	38		10		2
How likely are you to participate again in the program?	Total Responses	Very likely	Somewhat likely	Neutral	Somewhat unlikely	Very unlikel
Mentors	32	21	9	1	1	0
Students*	48	13	20	6	7	2
Knowing what you know now, would you have participated in the program?	Total Responses	Yes				No
Mentors	32	31				1
Students	51	43				8

**** Three students indicated they will graduate prior to Fall 2022***

Conclusions and Future Work

The inaugural year of the Chemical Engineering student mentoring program was a huge success in many ways. Fifty-eight chemical engineering sophomores, juniors and seniors completed the program and elevated their understanding of career opportunities, career expectations and communication skills in better preparing them for future employment or graduate school. As a side benefit, six of the students obtained an internship or permanent job through interaction with the mentors. The mentors, and most particularly the younger alumni, were able to strengthen their connection with the Chemical Engineering Department and its students, giving them a real opportunity to give back to the university. Several mentors expressed that they wished this program existed when they were students. The students were very grateful to the mentors for taking time out of their busy schedules and for sharing their expertise. They felt like they now have a better understanding of chemical engineering and their futures after graduation and improved their soft skills as well.

Preparations are currently being made for the second year of the mentoring program. Mentors from the first year of the program will be invited to participate again. After existing mentors have been given the opportunity to participate again, invitations will be sent to other alumni to complete the mentor group. Student participation will again come from the sophomore, junior and senior classes regardless of whether they participated in 2021-22 or not. As part of planning the 2022-23 program, the Steering Committee will determine the best way to incorporate 2021-22 student participants into the 2022-23 program so that the returning participants and new student participants will all have meaningful experiences. Additionally, feedback from the fall

and spring surveys will be evaluated to incorporate lessons and best practices into the program for future years. Mentoring in the 2022-23 program will effectively end with the Fall semester in order to respect the students' time in the busy Spring semester, and a final celebration and group mentoring event will be scheduled for January or February.

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Mr. Dean recently joined the law firm of Ruggiero, McAllister, and McMahon LLP as a member after 22 years at the law firm of Ohlandt, Greeley, Ruggiero & Perle LLP, both located in Stamford, Connecticut. He was also previously associated with The Dow Chemical Company for 12 years. He has practiced intellectual property law for 34 years. He is a past president of both the Arkansas Academy of Chemical Engineers and the Connecticut Intellectual Property Law Association.

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