Engineering Educators Bringing the World Together
2025 ASEE Annual Conference & Exposition
Palais des congrès de Montréal, Montréal, QC • June 22–25, 2025
Paper ID #46657

Entrepreneurially Minded Learning (EML) Micromoment Activities Generated Using Students' Experiences in a Fluid Flow and Heat Transfer Course

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Abstract

The Entrepreneurially Minded Learning (EML) Framework involves the 3 C's: curiosity, connections, and creating value. Several design courses, open-ended assignments, and laboratory experiences can successfully lead to EML implementations. However, these implementations require extensive class time and instructor feedback, limiting their use in core engineering courses. Developing EML activities that are active, engaging, and rapid to deploy in a classroom setting can promote the sustained growth of an entrepreneurial mindset (EM).

EML micromoment activities are emerging as a practical tool to facilitate the incorporation of the 3 Cs through rapid activity implementations that only last 2 – 30 minutes. These micromoment activities also promote inclusive teaching, improved teaching, and allow students more opportunities to develop an EM. Although a micromoment activity list was generated by researchers in a previous study [1], examples related to specific disciplines, including chemical engineering core courses, are lacking. Therefore, there is a need to create instructor guides to help deploy EML activities in these courses, reassuring the audience of their feasibility and practicality.

This study explores the use of micromoment presentations to enhance student engagement with fluid flow and heat transfer concepts in engineering courses. Students prepared 5-minute presentations based on their personal interests, professional experiences, hobbies, or life events, covering topics like how turbines work (creating value) and baking bread (making connections). A comprehensive list of these student-generated activities is provided, along with survey results reflecting their experiences. Insights from open-ended survey responses informed the development of four instructor-led micromoment activities targeting curiosity, connections, and value creation, including examples such as *The Science of Sap and Maple Syrup Collection* and *How Does Bread Bake?*. These guides aim to support the future implementation of micromoments in fluid flow and heat transfer courses, with plans to assess their impact on learning and engagement in subsequent evaluations.

1. Introduction and Background

The entrepreneurial mindset (EM), defined as an "inclination to discover, evaluate, and exploit opportunities" [2], is a key focus of the Kern Entrepreneurial Engineering Network (KEEN), a consortium of over 50 engineering schools aimed at fostering entrepreneurial thinking in engineering students. Central to this effort is the Entrepreneurially Minded Learning (EML) educational framework, which is founded on the 3C principles of *curiosity, connections, and creating value*[3], [4]. While EML has been successfully implemented in design courses, open-ended assignments, and laboratory experiences[5], these approaches often require extensive class time and significant instructor feedback, limiting their applicability in core engineering courses. To address this challenge, KEEN provides resources through the Engineering Unleashed platform[6], which offers over 2,500 activities—referred to as cards—designed for rapid classroom deployment and peer collaboration. Additionally, KEEN organizes annual meetings and workshops to support faculty in integrating EM into their teaching practices. Developing active, engaging, and time-efficient EML activities can further promote the sustained growth of an entrepreneurial mindset in engineering education.

EML micromoment activities are a pedagogical tool to facilitate the incorporation of the 3 Cs through short activity implementations that only last 2 - 30 minutes[1], [7]. These micromoment activities also promote inclusive teaching[8], improve teaching, and allow students more opportunities to develop an EM. Although researchers created a micromoment activity list and made it available online [9], examples related to specific disciplines, including chemical engineering core courses, are lacking. Therefore, there is a need to create instructor guides to help deploy EML activities in these courses, reassuring instructors of their feasibility and practicality.

In this study, students were assigned to prepare micromoment presentations on fluid flow and heat transfer processes based on their personal interests, professional experience, hobbies, or life events. Each student had 5 minutes at the beginning of each lecture to present a micromoment. Examples of micromoment activities include how a turbine works (creating value) and baking bread (making connections). Students' activities were listed and are made available in this study. Students also completed a brief survey about their experience generating a micromoment, and the results are discussed.

This work focuses on developing EML micromoment activity guides based on the student examples presented. These newly instructor-developed micromoment activities specifically target fluid flow and heat transfer concepts and correlate with the available micromoment activity list[9], including activities such as “Question Frenzy,” “Painstorming,” and “How do we make this better?.” Overall, the study aims to provide instructors with future EML micromoment implementation guides or mini adventures for fluid flow and heat transfer courses in engineering.

2. Assignment, Participants, Survey Instrument, and Methods

2.1 Assignment: Micromoment activity/guidelines:

The scope of this work is to generate micromoments based on student-led micro-presentations. The assignment was *open-ended*, and specific instructions provided to the students to prepare the micromoment presentations were as follows:

> “Each student must present (max of 5 minutes) a topic related *to fluid flow and heat transfer* that can be found in daily life activities (e.g., flow through a tube when you open a faucet) or related to your job experience (e.g., using heat exchangers), or a YouTube video, TV show, etc. Because the presentation is open-ended, you can go beyond the class expectations. Dr. Vasquez will provide an example “micromoment” presentation during class time.”
>
> **“Learning Objective:** Promote *active and collaborative learning of fluid flow and heat transfer processes* by: (1) promoting an *entrepreneurial mindset* by finding value and applications of course concepts with industry applications, research studies, daily activities, personal interests, or job-related opportunities, and (2) motivating students in

communicating engineering core concepts to a broader audience (i.e., classmates and professor)."

Due dates and deliverables:

- *Presentation dates selected through random number generator* (Excel)
- 5-minute presentation (1 slide or Poster) will be done at the beginning of class. If the student chooses a slide (PPT, Google Doc or publisher), this MUST be sent to the course instructor 24 hours prior to class."

Assessment

- The student-led micromoment activities counted as a homework grade (~ 0.5% of the overall course grade).

2.2 Participants and prior exposure to EML concepts

A total of 33 students participated in and completed the micromoment activities in this study. However, only 32 students completed the survey. The students were divided into two-course sections on Fluid Flow and Heat Transfer Processes at the University of Dayton. Section 1 had 17 students, while Section 2 had 16 students. Approximately 75% of the students (n = 25) disagree or strongly disagree with using the EML approaches in their classes prior to this activity. Therefore, it is important to note that this was the first exposure to some EML concepts despite the fact that the course is taught at a senior level.

2.3 Survey Questions:

Eight short questions were given to the students to be ranked using a Likert scale, where 1 = strongly disagree and 5 = strongly agree. The specific questions (Q1-Q8) are shown in **Table 1**. The EML was assessed by questions 6 – 8, where Q6 evaluated curiosity, Q7 assessed connections, and Q8 correlated with creating value.

Table 1. Questions used to assess the micromoment student-led presentations using a Likert scale (1 = Strongly Disagree and 5 = Strongly Agree).

Q1	Overall, I enjoyed my peer's micromoment presentations from both a technical and practical perspective.
Q2	Preparing a 5-minute micromoment presentation was a valuable use of my time.
Q3	I learned my topic of interest well enough to explain it to the class.
Q4	The 5-minute micromoment presentations were a good introduction and effective use of time for this class.
Q5	Technical assignments related to micromoments helped improve my learning in this class.
Q6	Because of the micromoment activities and the presentations of my peers, my *curiosity* about fluid flow and heat transfer increased.
Q7	Because of the preparation required to present a micromoment activity to the class, my ability to integrate information from many sources to gain insight improved.
Q8	Because of the micromoment activities, my ability to identify unexpected fluid flow and heat transfer applications that create value (in terms of knowledge) improved.

In addition, the students were given a few short-answer qualitative research questions, which are shown in **Table 2**. The rationale for P1-P3 was to identify how curiosity, connections, and creating value were used by the students when preparing the micromoment presentation. Question P4 is used to determine the most effective/popular micromoments presented by the students. Question P5 was used to assess improvements in delivering micromoment activities, and Question P6 was asked to obtain suggestions or recommendations that could help the authors and educators prepare micromoment activities.

Table 2. Qualitative research questions were asked to the students to validate the EM learning and to obtain data for producing micromoment activities.

P1	Describe how your curiosity increased/decreased because of the micromoment presentations.
P2	Describe how you integrated information from many sources to gain any insights about fluid flow and/or heat transfer during the preparation of your micromoment presentation.
P3	Describe how you identified unexpected opportunities to create value (for your classmates knowledge) during the generation/presentation of micromoments in the classroom
P4	From the micromoment list provided, choose the top three micromoments that impacted you the most? (in terms of communication, building engagement, curiosity, connections, and unexpected value creation in terms of knowledge)
P5	What can be improved for future student-led micromoment presentations?
P6	Do you have any additional comments or suggestions about using micromoments in this class?

2.4 Methods for generating micromoment activities

The micromoment activities presented in this study are based on the original 25 micromoment activities prepared by researchers at the University of North Carolina at Chapel Hill [9]. From these, 10 micromoments correlate to connections, 9 to creating value and 6 to developing curiosity. Out of the 25 micromoments, 8 activities can be deployed in 10 or fewer minutes, and we focus on these specific activities to generate specific fluid flow and heat transfer applied micromoments using the student-led micromoment presentations.

Answers to question P4 are used to rank the top-10 micromoment presentations out of the 33 presentations given by the students. Using the information in P4 and with the 8 micromoment activities, the authors adapted the newly developed fluid flow and heat transfer micromoments. Additionally, comments on Questions P5 and P6 were reviewed and used to generate engaging activities, as discussed in the next section.

3. Results and Discussion

3.1 Students perception of micromoment presentations

Overall, students enjoyed preparing and listening to the micromoment activities presented by their peers. Results for Q1-Q5 are shown in Figure 1. Q1 explicitly asked students about enjoying and learning their peers micromoment presentations, and 30 students strongly agreed or agreed to this answer. Q3 also shows a high number of strongly agree or agree responses, demonstrating that students learned their topic of interest well before presenting it to their classmates. Answers for Q2 and Q4 had a higher number of agree responses; however, neutral and disagree were also present at a small frequency. These questions were related to effectively using class time and time outside the classroom to prepare the micromoments. Answers to Q5 had higher responses for neutral, a question related to the technical assignments and improving their learning because of the micromoment presentation. This gap motivated us to prepare more technical micromoments that are more engaging and useful in the classroom so that students can prepare better for the lecture or topics covered in class.

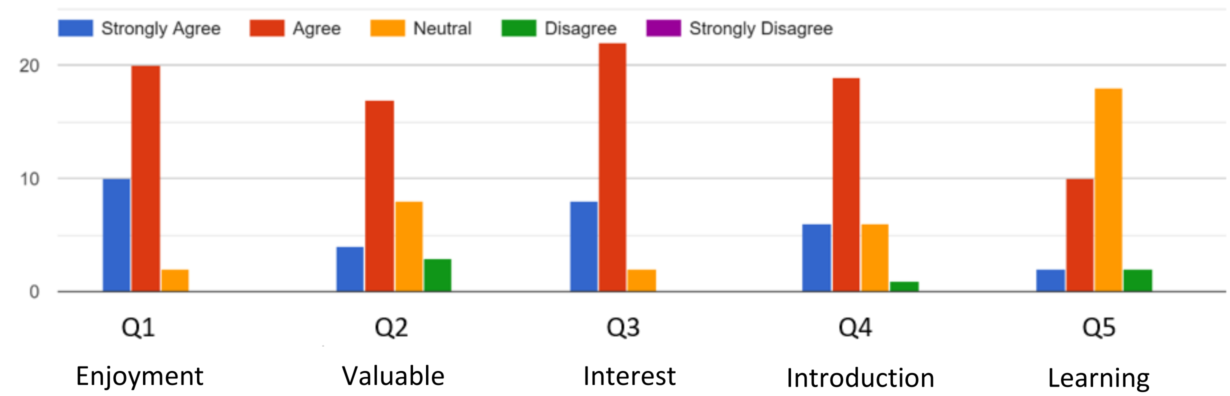


Figure 1. Results for Q1 - Q5 for the micromoment survey with "keywords" identifying key aspects of each question

3.2 EML Integration with "Curiosity"

Questions Q6 and P1 were utilized to evaluate the correlation between curiosity—one of the 3 Cs—and the micromoment presentations. Figure 2 shows the combined results for Q6, revealing that approximately 85% of the students agree or strongly agree that their curiosity about fluid flow and heat transfer increased after engaging with the micromoment presentations. From an instructor's perspective, it was clear that each lecture allowed students to present an intriguing topic related to fluid flow or heat transfer. The combination of student enthusiasm and the conceptual clarity delivered during these presentations contributed significantly to the overall value of the experience and the high level of curiosity generated.

Students' feedback discussed next, further reinforced the impact of these presentations in fostering curiosity about learning from classmates' diverse experiences. For example, one student shared insights from a semester of service in Ecuador, where they worked on drinking water systems. Other students highlighted their co-op experiences, such as working with heat exchangers or performing maintenance tasks, including replacing tubes in a shell-and-tube heat exchanger. Overall, the micromoment presentations demonstrated a significant increase in students' curiosity.

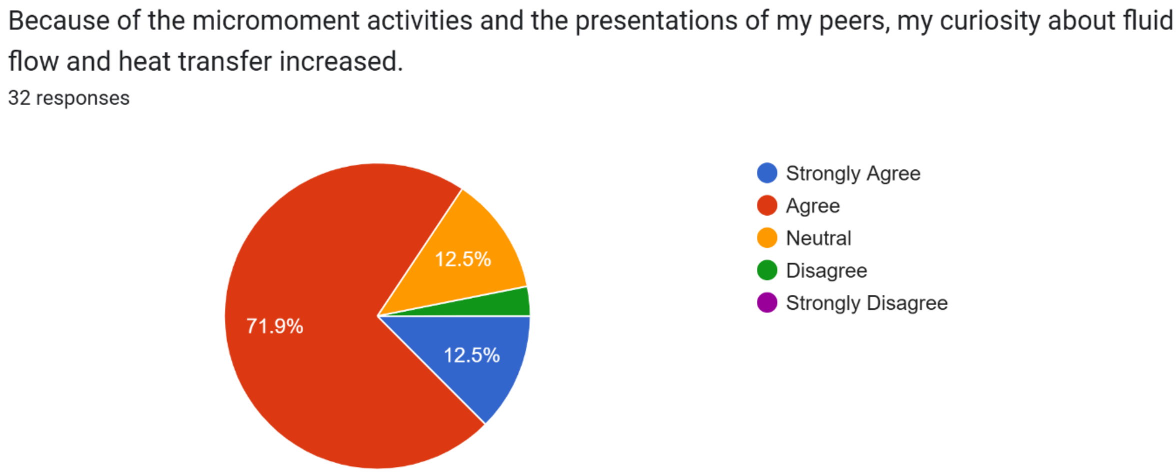


Figure 2. Results for Q6 showing a high percentage of students agreeing or strongly agreeing to curiosity

To further confirm the correlation between curiosity and the micromoment presentations, we examined a few qualitative responses to P6 on how curiosity changed for some students. Examples include:

> *"Classmates were often able to relate topics in fluid flow and heat transfer to real applications either in industry or nature."*
>
> *"These micromoments showed just show many things even outside of chemical engineering are related to fluid flow and heat transfer."*
>
> *"Seeing the real-world applications of heat transfer increased my appreciation of the phenomena because I was able to see how heat transfer affects my life each day."*
>
> *"Being able to see real world applications helped make this class make more sense. I really liked day to day things like the candle because you wouldn't think of it, but I also really enjoyed the ones about industry because I can see how it would apply to me in the future."*
>
> *"Since I never co-oped, I was interested to see the experience my peers went through during their work. That increased my interest in the subject."*
>
> *"I think my favorite presentations were the ones that had to do with topics outside of engineering. It definitely showed heat transfer and fluid flow outside of just work."*

The students demonstrated curiosity towards learning about industry applications and scenarios outside of engineering coursework, which was a learning objective of the micromoments presentations. There are, however, a few interesting responses about not increasing curiosity in some students. Some students cited the lack of connection between the micromoment and the class content. For example, some students discussed heat transfer examples when fluid flow applications were discussed in the class lecture. A few students highlighted that connecting the course content with the micromoment will make it more meaningful. This is another reason that we decided to generate specific micromoments that could be adapted at the beginning of each lecture and connect directly with course content.

3.3 EML Integration with "Connections"

Figure 3 presents the responses to the connections question. Notably, half of the students (n=16) provided neutral responses to this question. A limitation of the study was the tendency of students to relate to a singular reference, such as one YouTube video or one specific example in their co-op experience. While connections were made, integration was absent across multiple sources of information.

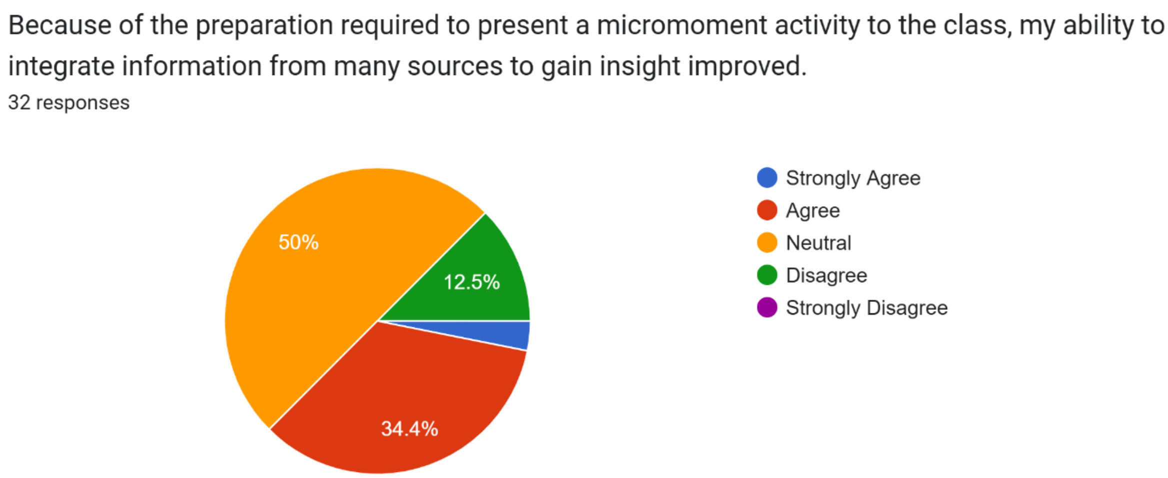


Figure 3. Student responses related to creating connections (Q7) to different sources of information

The students' responses to question P2 confirmed the limitations of relying on a single source of information for the micromoments presentation. Additionally, the grade percentage allocated to the micromoment presentations was relatively low, equivalent to a homework assignment (i.e., < 0.5% of the total grade). Consequently, this may have contributed to a lack of significant effort from some students in preparing their presentations. A few student responses are shown below:

> *"I wouldn't say that I used a lot of sources when preparing my micromoment, I based it on knowledge that I already had when I was preparing the micromoment although I did then compare to our class notes."*

> *"I pulled information from my Co-Op at DuPont and integrated it into a PowerPoint"*

> *"I used my previous experience to tie into a video that I found. This activity helped me to search for a video that would be relevant to both my experience and the fluid flow class."*

> *"I used my practical experience from my internship to inform my micromoment rather than collecting information from multiple sources so this doesn't really apply to me."*

"I conducted research for my micro moment topic but due to the short length I only used 1-2 sources. Therefore, while I compared information across these sources, due to the short length I did not look into a wide variety of sources."

"For my micro moment, I was able to pull from my internship which was exciting to see how the classroom actually connects to the real world."

"I spent time thinking about things we use in everyday life but don't know much about, and realized that everyone uses an air conditioner at some point but very few people know how they actually work. Youtube is a great source for information like this, condensed into quick videos."

Overall, most students found a topic of their choice and connected it to an application in their daily life or experience or found a YouTube video that correlated with their research. Out of the 17 micromoment presentations in section 1, 13 presentations used a YouTube video. Section 2 only presented PowerPoint slides or Google Slides. The predominance of YouTube videos in one section could be attributed to the early presenters who used video for their talks. Also, other sources of information were used, such as online websites, and one student used AI to narrow his research topics, as shown in the following quote:

"I used AI to give me a list of topics to choose from then I went of YouTube to find videos about the topic since I thought this would be the best way to learn about it."

The integration of YouTube content into engineering problems is well documented, as described elsewhere[10], [11]. In this study, however, we focused on explaining the video in terms of fluid flow and heat transfer concepts rather than making problems from the video. Next, we focus on preparing micromoments, which are rapid and quick activities that can be delivered early during lectures to facilitate teaching and learning of new concepts.

3.4 EML Integration with "Creating Value"

Problem solvers, stakeholders, innovation, and understanding needs are themes found in the "Creating Value"[12]. In this study, we used the theme of understanding needs and identifying unexpected opportunities as value creation for content generation. For the student-led micromoment presentations, we examined questions Q8 and P3 to get an overall idea of what students believe about creating value. The quantitative results are shown in Figure 4. It is observed that approximately 70% of the students agree or strongly agree that they were able to create value for their peers by presenting a micromoment at the beginning of each class. This theory is reinforced with qualitative comments from question P3, as shown below:

"Some of the micromoments provided interesting insight into practical, non-traditional applications of fluid flow to other aspects of engineering/design…."

"I was able to relate my micro moment back to real life rather than just being a random fact and showed how knowing the information could potentially be important in our lives."

"I typically don't talk about my work during school hours but I really enjoy the work that I'm doing so I was excited to discuss it in my micromoment for the class. I also think it was a learning opportunity for me, I know more about the system than I did before."

"For my micromoment, I talked about how using a heat exchanger saved my company thousands by prolonging enzyme activity. I think this was a unique perspective on how heat transfer can be used to generate cost savings"

"I thought about the topics in class and made the information more relevant for my peers by explaining how it applied to my work this summer as a co-op."

"I identified unexpected opportunities to create value by looking around in daily life and seeing how ordinary, every day life things contain fluid flow and heat transfer concepts"

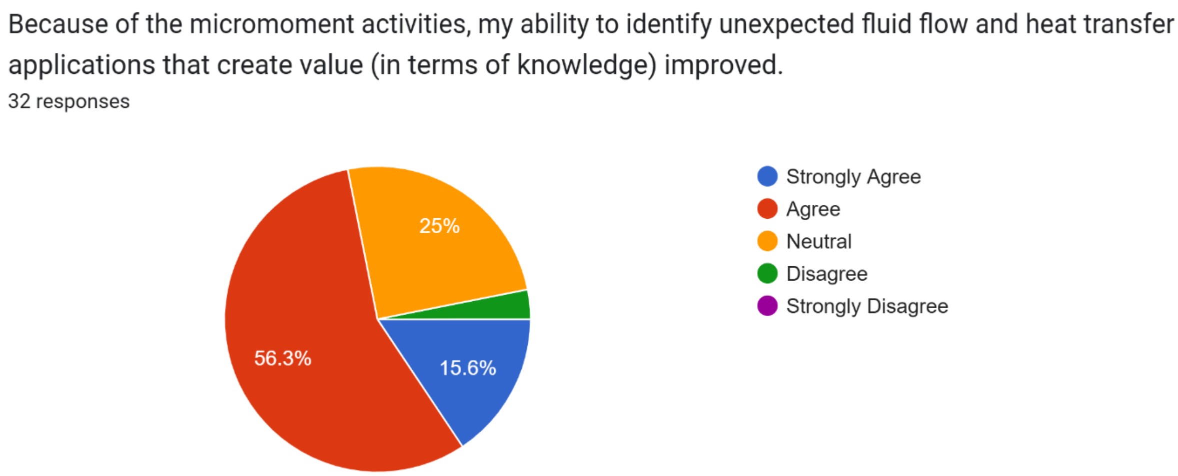


Figure 4. Results for Q8 related to "creating value" and unexpected opportunities in fluid flow and heat transfer applications.

As noted above, students found value in communicating their knowledge to their classmates and some retained information from their peers' presentations. Additional themes that could be found in the qualitative answers include explaining equipment or machinery in a plant, finding applications in daily life situations, and reducing costs. This study clearly emphasized that micromoments led by the students can be used for value creation, in particular, as the concepts connect with their life experiences or general knowledge. On the other hand, one student complained about the short duration of the micromoment (5 minutes) to create value as noted below:

"I did not identify unexpected opportunities to create value. I presented on a topic I felt was interesting and was also familiar with but with the short length of the presentation I did not feel that I generated a great amount of value for my classmates."

While this comment is important, we believe that it can be addressed by generating micromoment activities that connect to concepts taught during class. Hence, our rationale is to produce technical micromoments to complement the existing list of activities [9] and technical micromoments discussed elsewhere[7], [13], [14].

3.5 Connecting Students Suggestions to Micromoments generation.

Answers to qualitative questions P4-P6 are used to identify missing gaps and the most important micromoments discussed in the classroom. A list with all the micromoments generated by the 33 students in both sections is presented in **Table 3**. In bold, we show the top topics selected by the students (answers to P4, Table 3).

Table 3. List of micromoments presented by students in the Fluid Flow and Heat Transfer Processes Course

Micromoment topics (Section 01)	Micromoment topics (Section 02)
Water Flow and Water Pressure (hose)	Air Cooled HVAC Units
Candles: three kinds of heat transfer	**Tube and Shell Heat Exchangers in Industry**
Science of Tapping Trees (Maple sap collection)	**Thermoregulation (regulating your internal body temperature)**
Venturi effect in blood flow	**Sputnik and AIMM (Batched Heated reactor)**
Bernoulli's Principle: How Planes Fly	Heat Transfer and Solid-State Fermentation
Shell and Tube HX for enzymes	Laminar Flow box
How a Gas Turbine Works	**How does bread bake?**
The Science behind ocean currents	Car Radiator
How Air Conditioning Works	Kettle Reboiler
Viscosity of Body Sealer	Solar Thermal Collectors
Drinking Water Systems (Ecuador ETHOS)	**Heat Schock Protein**
Calculating Tramp Air in Fired Heaters	Ultrasonic Flow Meter
Pressure effects in Blood flow (introduction to edema)	**Cleaning a 1982 Heat Exchanger**
Diaphragm Pumps	Pot Stills
Steam Ejectors	Peltier Element
Heat Transfer in Cooking	Effects of Alcohol in Heat Transfer
Fluid Flow and Heat Transfer Principles in Climate	

In addition to obtaining the “top-ranked” micromoments, we also examine the students’ suggestions for future efforts. Examining the answers to question P5: *What can be improved for future student-led micromoment presentations?* and using AI (ChatGPT 4.0), five general themes were obtained, including: “Alignment with class material, guidance and resources, timing and accessibility, engagement and interaction, and open-ended creativity with practical constrains.” Of significance in the alignment with class material, we found that presentations should connect directly with class topics to enhance understanding and relevance of the content. Also, students noted that engagement can increase by encouraging real-life engineering applications for everyday usage and allowing a discussion of the topic after each student presentation. Due to time constraints, this was not done, and most of the time, students did not follow up with questions.

Additionally, we looked at the answers to question P6: *Do you have any additional comments or suggestions about using micromoments in this class?* and summarized the answers using AI (ChatGPT 4.0). The following themes emerged:

"Use Micromoments as Teaching Tools

- Present all micromoments over a few class sessions and integrate them into the course by using them as examples to teach or discuss relevant topics. This would enhance their utility beyond stand-alone presentations.

Incorporate Visual and Relatable Content

- Focus micromoments on short, engaging videos directly tied to the day's topic. The visual aspect helps capture attention and supports learning, offering a smoother transition into class concepts.

Encourage Students Participation

- Ensure students approach micromoments with genuine effort to maintain engagement and value for the entire class. Setting clear expectations may help improve the quality and relevance of presentations."

To effectively incorporate student suggestions and implement improvements for future micromoment activities, we propose the introduction of technical micromoments at the beginning of each lecture. This approach is expected to enhance engagement and foster a more inclusive learning experience by involving all students rather than solely the presenter of the day. Furthermore, this work prioritizes the alignment of top-ranked student-prepared micromoments with course material to ensure their relevance and educational value.

3.6 Fluid Flow and Heat Transfer Newly-Developed Technical Micromoments

In this section, we present four micromoment activities designed for use at the beginning of lectures traditionally taught in chemical engineering fluid flow and heat transfer courses. These micromoments are developed based on the curated list provided in prior sections and draw upon insights from our previous work on micromoment implementations.

<u>Micromoment activity 1: The Science of Sap and Maple syrup collection (10 mins; Curiosity)</u>

Watch the following YouTube video and identify at least one key concept of fluid flow behind the science of Sap and maple syrup collection. Google or find another YouTube video to get one additional concept on the science of Sap that relates with fluid flow and/or pressure differences.

https://www.youtube.com/shorts/HNPXpAGBAqs

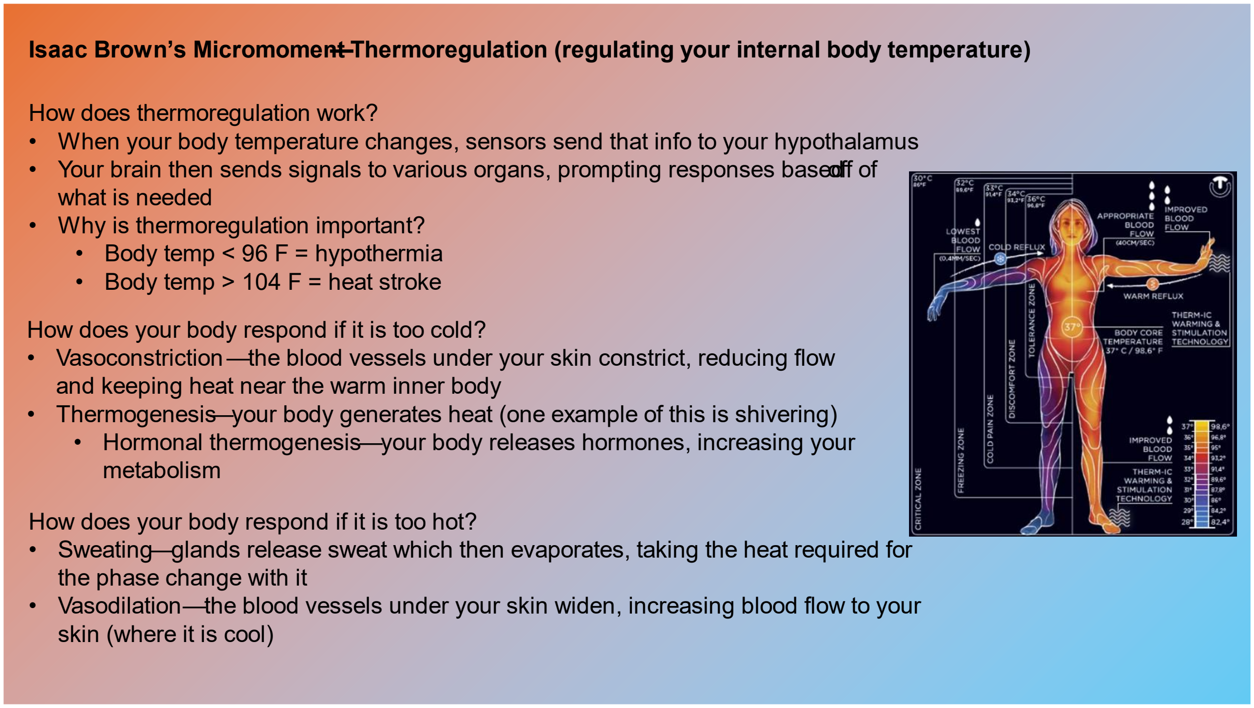
Partner in groups of three and discuss your findings.

Discuss this slide[15]:

Follow up topic in class: Fluid flows from high pressure to low pressure (Mechanical Energy Balance Equation)

<u>Micromoment activity 2: What is the Value of clothing? (10 mins; Creating Value)</u>

Read the following slide and this abstract [16], and discuss the value of clothing in thermoregulation



Topic to discuss: film heat transfer coefficients and Newton's law of cooling

<u>Micromoment #3: Question Frenzy about heat exchangers (5 mins, Curiosity)</u>

Watch the following YouTube video animation and the figure below and write as many questions as possible (~ 3 minutes)

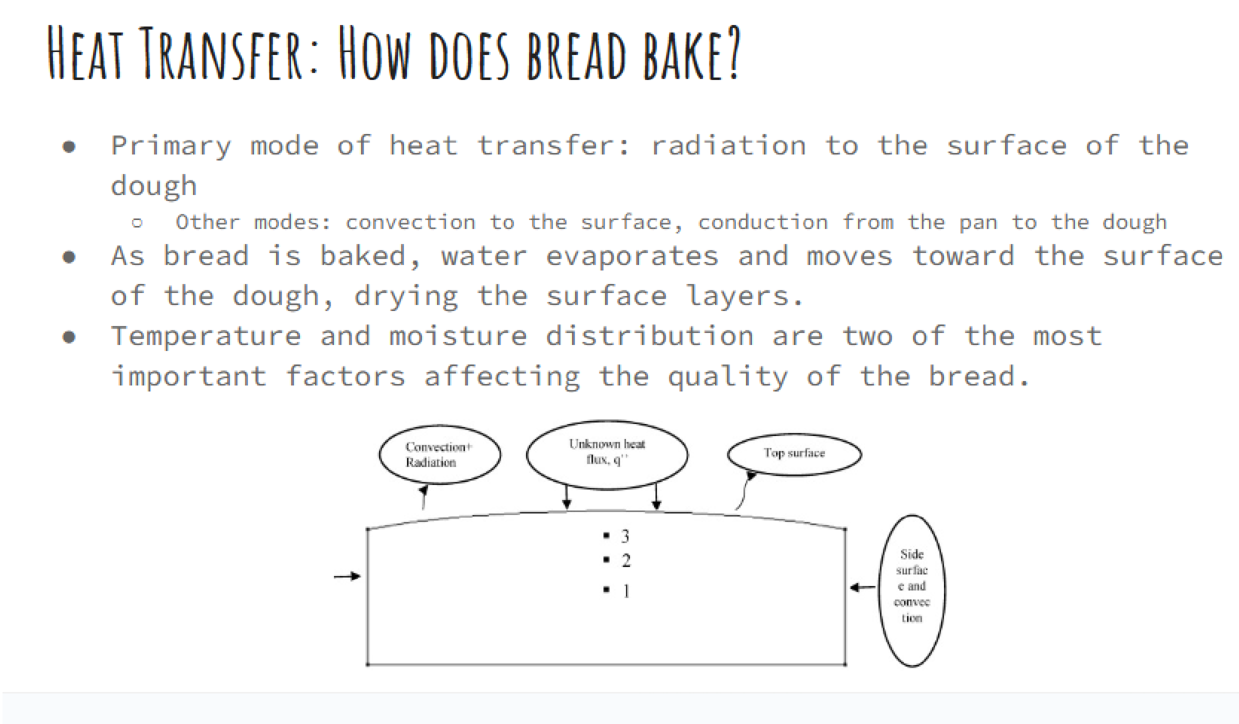
[Shell And Tube Heat Exchanger Animation](https://www.youtube.com/watch?v=kXUeBTvpa94) (https://www.youtube.com/watch?v=kXUeBTvpa94)

Ask a few students to share the questions that they came up with.

Topic to discuss: Shell-and-Tube heat exchangers

<u>Micromoment #4: How Does Bread Bake? (5 minutes; Connections)</u>

Check the following slide and identify as many "pains" you can observe in the production of bread.



Topic to discuss: Introduction to Heat Transfer (conduction, convection, and radiation)

4. Conclusions, Recommendations, and Future Work

The impact, efficacy, and alignment with an entrepreneurial mindset of implementing student-led micromoment presentations in the Fluid Flow and Heat Transfer course at the University of Dayton were demonstrated through instructor observations and survey-based methodology that included quantitative and qualitative data. In this open-ended assignment, the instructor provided diverse scenarios for the preparation of 5-minute micromoment presentations, encouraging students to explore the value and applications of course concepts within numerous contexts such as industry experiences, research studies, daily life activities, personal interests, or job-related opportunities. Students selected various case studies to develop 5-minute presentations, resulting in a diverse array of topics, ranging from YouTube videos and co-op or student-job experiences. The extensive range of topics (n = 33; **Table 3**) contributed to a rich repository of technical content, fostering students' curiosity, connections, and value creation—three pillars of the entrepreneurially minded learning framework.

Survey results indicated that students enjoyed both preparing and listening to the various student-led micromoment presentations. For these 5-minute presentations, the survey showed strong correlations with “strongly agree” and “agree” responses for fostering *curiosity* (85%) and *creating value* (70%). However, due to the limited allotted for presentations, fewer *connections* to various topics were made, where less than 40% of students "strongly agreed" or "agreed" with this theme of the entrepreneurial mindset.

Qualitative responses corroborated the quantitative Likert-scale findings, highlighting the strong relationship between student-led micromoments and the development of curiosity and creating value. Based upon the open-ended survey questions, two more open-ended questions (P5 and P6) were included to obtain insights on producing high-quality technical micromoments. Results suggested that micromoments could serve as effective teaching tools by incorporating visual and relatable content while encouraging active student participation. These findings motivated the development of four instructor-led technical micromoments, intended for delivery at the beginning of select lectures in the near future.

As a result of this work, four instructor-led technical micromoment examples related to fluid flow and heat transfer were developed (1) The Science of Sap and Maple syrup collection (10 mins; *Curiosity*), (2) What is the value of clothing? (10 mins; *Creating Value*), (3) Question Frenzy about heat exchangers (5 mins, *Curiosity*), and (4) How Does Bread Bake? (5 minutes; *Connections*). These activity guides are provided for instructors interested in implementing micromoment activities into courses on fluid flow and heat transfer. Additionally, several other topics (**Table 3**) are available to create additional micromoments. Future efforts will focus on implementing these four micromoments and evaluating student responses to assess their effectiveness in learning and engagement during class lectures.

5. References

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