

FUTURELAB+

Capstone Project

Student Design Journal

Developed in partnership with:
Discovery Education

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Student Capstone Journal

OVERVIEW

This student capstone journal will serve as a guide to help you meet the expectations and goals of your project and as a record of your work throughout your capstone experience.

This student journal includes:

- Activities to help you create your capstone project
- Resources to help you plan out your year-long capstone project
- Strategies to help you complete milestones
- Guidance on where and how to present your work
- Information to secure and use your capstone project mentor
- Tips to decompose the project into small and manageable goals
- Suggestions to track your progress and manage your project



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Contents

1 CONCEPTION OF THE CAPSTONE

A brainstorming activity to help you identify educational and personal interests. Use this activity to help identify problems or questions that you would like to explore through your work in the capstone project. You will take career and interest inventories and look at example capstones to help you narrow down and determine goals for your capstone project.

2 THE CAPSTONE PROPOSAL

This formal proposal will outline and list tasks and goals for your capstone project. It will be submitted for approval to the capstone facilitator.

3 RESEARCH

In this section, you will research your topic and prepare a presentation that will be given to peers, classmates, industry professionals, and educators. It will give background on your topic and introduce the problem or question that your capstone is centered around.

4 MENTORSHIP

You will investigate different ways to reach out to a professional in a career field related to your capstone topic. This may include writing and sending emails to potential mentors and working with your project facilitator (teacher) to connect you with a mentor. This relationship will serve as a resource for guidance and expertise throughout your capstone project. You may have several mentors supporting your independent project.

5 PROJECT MANAGEMENT

In this section, you will create a Gantt chart (a type of project management tool) that gives start and end dates for the project milestones you have identified. You will also record feedback from weekly check-ins with the project facilitator (teacher).

6 PROJECT WORK AND DOCUMENTATION

This section of the journal is where you will document your work on the capstone project.

7 CAPSTONE PRESENTATION

As a culmination of your capstone project work, you will present the capstone project to community members, industry professionals, and stakeholders. This will provide guidelines and tips for your presentation, as well as a checklist to help you prepare.

8 REFLECTION

In this final section, you will reflect on your capstone project. This includes how you feel you managed the project, what you learned about your topic, the impact on your local and global community, and new career interests and future goal setting.

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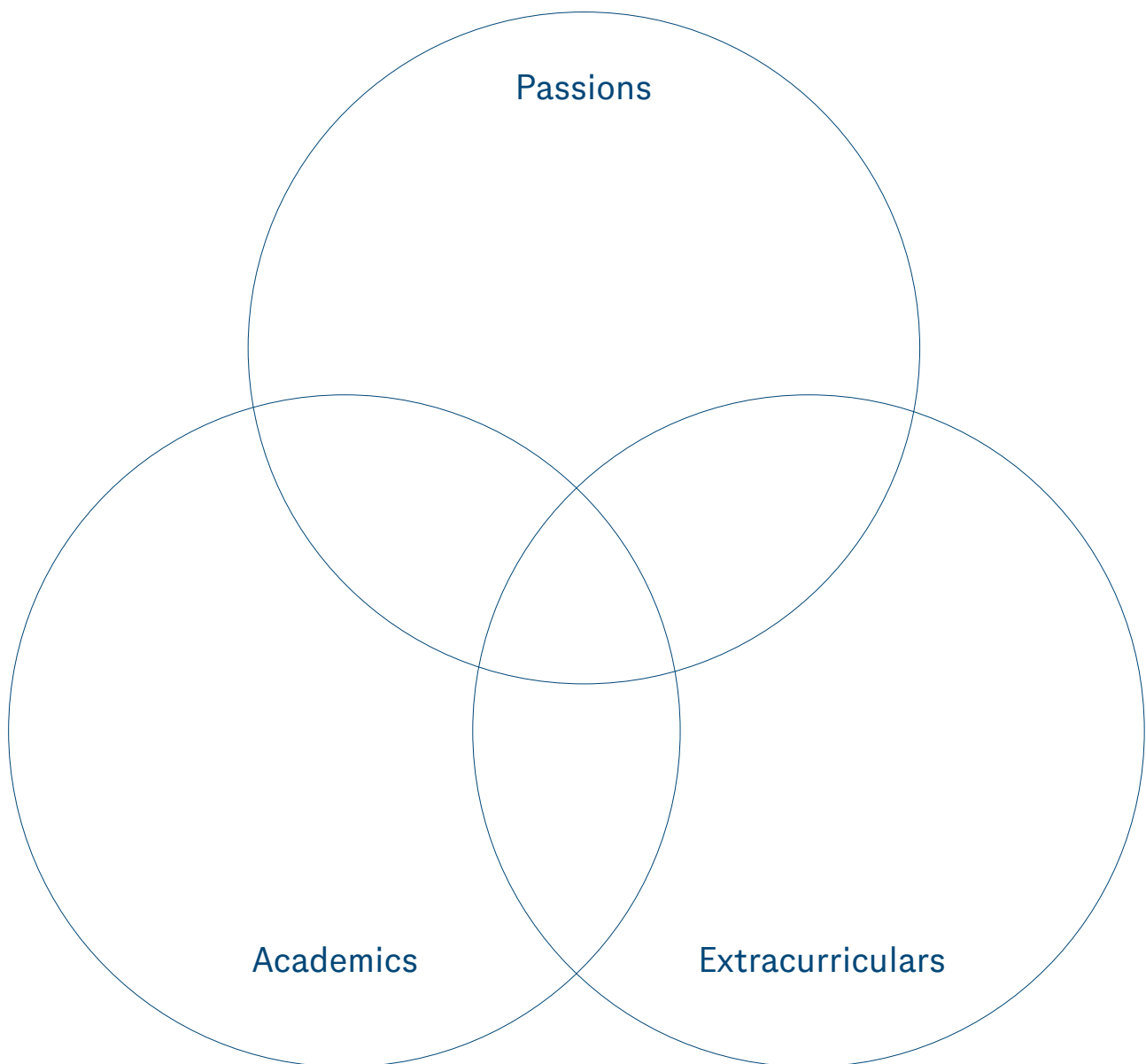
1. Conception

Part 1: Getting Venny With it

In this brainstorming activity, you will complete a Venn Diagram that will require you to think about your interests and things you enjoy and spend your time doing.

In each of the circles (Academics, Extracurriculars, Passions) record one or more subjects or extracurriculars that you enjoy doing and 1-2 things you feel strongly or passionate about.

Try to make connections between the circles where they overlap with ideas of an inquiry question or project that would combine the two. In the center where all circles overlap, brainstorm project ideas that would combine your academic, extracurricular, and personal interests.



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1. Conception

Continued

Part 2: Career Inventory

Next you will complete the career inventory to help you narrow down your interests and skills and determine how you would like to structure and present your capstone project.

Use the Futurelab+ *Biotech Career Finder Tool* to create a list of career pathways that you might be interested in or that may connect to the capstone topic you choose.

Career Finder

Go to the website: <https://futurelabplus.com/files/modules/career-finder/#/>

Click through the pages to get started and answer each of the questions. You must submit your answer after each question. When the survey is complete, you will get your personalized results. The size of each bar reflects how closely aligned you are with that career path.

Click on the **three largest bars** and complete the table below with the information you are given.

Career Pathway	Career Pathway Description	Career and Job Duties included in this pathway

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1. Conception

Continued

Think and reflect

What did you learn from the results of this career survey?
Did anything surprise you about your results?

How might one of these careers connect to your interests
or passions?

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2. Capstone Proposal

Project Components	Describe Your Project Below	Instructor Comments/Feedback
<p>1 Title of the Project</p> <p>The title should clearly and concisely summarize the project's focus.</p>		
<p>2 Project Overview</p> <p>What is the goal or objective of the project? What question or problem is being addressed?</p>		
<p>3 Project Description</p> <p>Describe the project in detail. List methods or approaches that will be used to achieve the objectives, along with any tools, technologies, or resources that will be involved.</p>		
<p>4 Project Objectives</p> <p>Outline objectives or milestones that will be accomplished in the project.</p>		
<p>5 Significance</p> <p>Explain why the project is significant. What will it contribute to a field of study or what issues will it address in the local or global community?</p>		

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2. Capstone Proposal

Continued

Project Components	Describe Your Project Below	Instructor Comments/Feedback
<p>6 Project Steps</p> <p>What steps will be taken to complete the project—including research, methodology, data collection, experiments, or prototyping? What issues will it address in the local or global community?</p>		
<p>7 Timeline</p> <p>Provide a general timeline for the capstone project, identifying key milestones in the project and the time needed for each.</p>		
<p>8 Resources Needed</p> <p>Include a list of any potential equipment or supplies you might need for the project, as well as resources or support necessary.</p>		
<p>9 Potential Challenges</p> <p>List any anticipated challenges or obstacles that could be encountered and how they will be addressed.</p>		
<p>10 Project Summary</p> <p>Sumarize the project, restating the goals and importance of the project and why it should be approved.</p>		
<p>Approved?</p>	<p>Instructor Signature:</p>	<p>Date:</p>

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3. Research

This section will include information about the topic—including the history, background information, data, and challenges or problems in that field or topic area. It should also include resources used for research, such as journals, web pages, and interviews.

Capstone Project

	Information	Sources Used
Topic Description		
Background Information/ History		
Data		
Challenges and Problems in this Field		

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3. Research

Continued

Research Presentation

You will use the research you've done to create a presentation to peers and advisors to introduce the topic of your capstone project and the questions you are asking or problems you are looking to solve within that topic or field.

This presentation will give you:

- the chance to get audience feedback on your topic and capstone plan
- practice your presentation skills before your final presentation of your capstone project at the end of the year

Suggested Presentation Styles/Outline

Pecha Kucha

This comes from the Japanese word “chit-chat” and is presented by showing a series of 20 slides that display for 20 seconds each, lasting for a total of 6 minutes and 40 seconds.

You choose images that align with your topic—outline them and arrange them in an order that will flow with the verbal presentation you write.

The Pecha Kucha presentation is done with the slides advance automatically and without notes. This requires you to be concise and know and practice the information you will discuss.

To learn more about a Pecha Kucha, view the following video: [How to make a PechaKucha presentation for class \[for students\]](#)

TED-inspired talk

A TED-talk begins with an introduction to grab the audience's attention. This can include an anecdote, idea, or relatable story that introduces the topic and why the audience should care about it.

Next you should move into the body of the talk, where you explain your goals for the capstone project and what you intend to test. Change or improve any points and explain why this is important. The conclusion of your talk will define key takeaways for the audience and a call to action to support the mission of the capstone project.

Images can be displayed on a screen as the presentation is given, but are controlled by you, the speaker. You should not use notes during the presentation so you should make sure you have practiced, are prepared, and are knowledgeable about your topic and project plan.

To learn more about how to create and present a TED talk, view the following videos: [TED's secret to great public speaking | Chris Anderson | TED](#), [6 Tips for Fascinating Presentation—The TED TALKS Style—PowerPoint Design Tips](#)

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4. Mentorship

Finding a Mentor

One of the most important pieces of your capstone project is to find and secure a mentor for the duration of the project. Your mentor should be someone who has expertise in the area that the capstone project topic centers on. They will serve as a support for you throughout your project for questions you may have or for valuable feedback.

How do I find a mentor?

- **Discovery Education's Career Connect** allows students to contact and interact with people in a wide variety of tech, science, and engineering careers via video chats. You can use this platform with your teacher to reach out to professionals that could serve as mentors.
- You can also reach out to potential mentors via email, letter, or phone call who are working in biotech industries, are **professors or educators at local universities and colleges, or are verified professionals and experts on social media platforms.**

How and how often should I meet with my mentor?

- You can choose to meet with your mentor in person or, if more convenient, through a video call such as Zoom. You should always meet with your mentor along with a trusted adult.
- You should create a schedule with your mentor that includes at least one monthly meeting that is documented. Depending on your mentor's availability or willingness to meet, you may meet more often, such as weekly or biweekly.
- Use the table below to log the meetings you have with your mentor throughout your capstone project. The mentor or supervising teacher will sign their initials to verify meetings have taken place.



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4. Mentorship

Continued

Stakeholder Interviews

For this part of your project work, you are required to identify and **interview two stakeholders** for the capstone project.

Stakeholders are people, communities, businesses, or environments that are directly or indirectly impacted by the project's outcome. They can be individuals or organizations that are actively involved in your project or people whose interests may be positively or negatively affected by the project outcome.

The feedback and information from your stakeholder interviews can be used to drive or revise your capstone project and can be used in your final capstone presentation.

To learn more about the stakeholders, go to the webpage: [What are Stakeholders? Stakeholder Definition / ASQ](#)

Stakeholder Interview—Pre-Interview Questions

As you think about the stakeholders you will interview, complete the following questions below:

1. What are the roles of stakeholders?

2. Identify your stakeholders—are they supportive of your project?

3. Create a potential list of stakeholders who will be interested in the results of your project.

4. How can you promote stakeholder participation in your project?

5. What might be possible concerns/barriers from stakeholders?

6. What might be some strategies that you will use to gain support and assistance from your stakeholders?

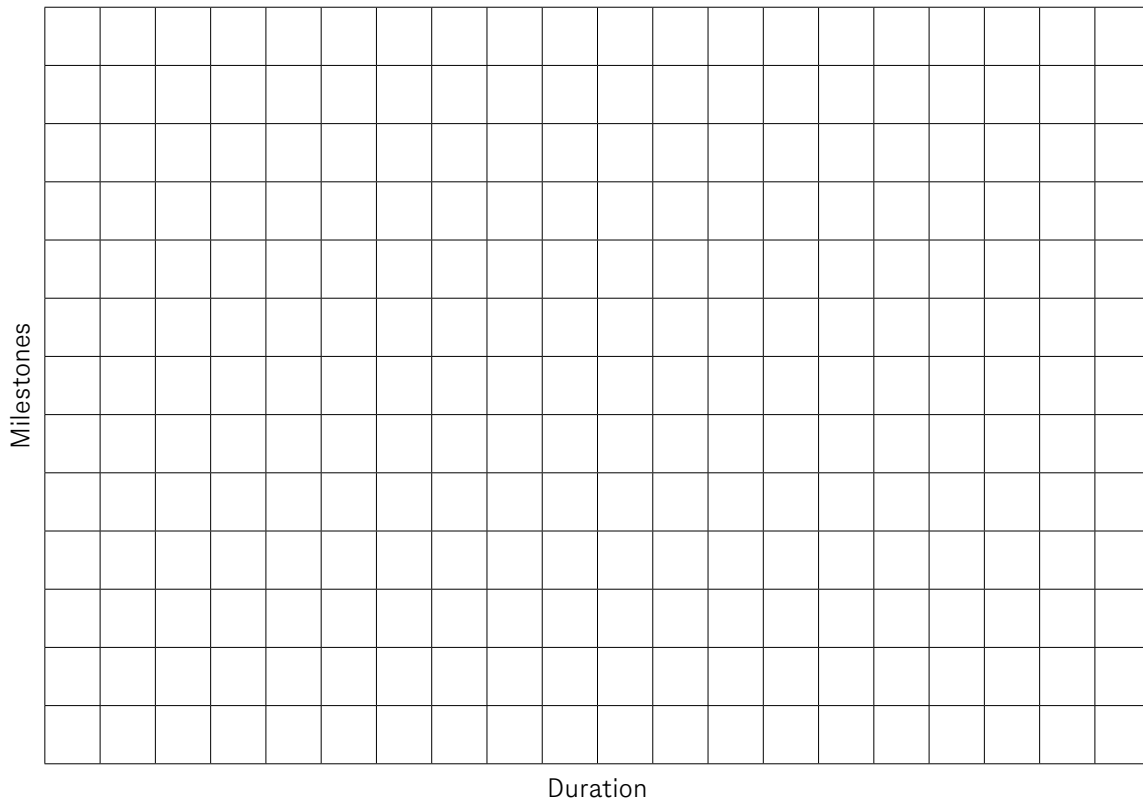
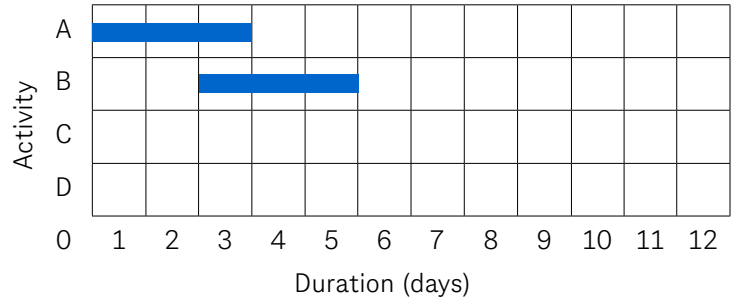
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5. Project Management

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Step 5: Use the **Milestones, Predecessors**, and **Duration** information from the previous chart to create a simple Gantt Chart. Use the information and examples from the video to help you. (See example below)

Activity	Predecessor	Duration (days)
A	—	2
B	A	3
C	B	4
D	C	3



Step 6 (Optional): You may choose to make an additional copy of the Gantt chart using Excel or a spreadsheet program. This way your Gantt chart can easily be edited as the project progresses and will be accessible anywhere to track the progress of your project.

Use the following video to help you create a digital Gantt Chart: [How to Make Gantt Chart in Excel](#)

You can print a copy of your completed digital Gantt Chart and add it to your Student Journal to show the final draft of your milestone timeline.

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6. Project Work and Documentation

Creating a Product

The product of the capstone project is often referred to as a “deliverable,” and can be one of the end results of a project.

This could be something such as an experiment, a prototype model, a data analysis, or a tangible outcome of the capstone.

The capstone deliverable is dependent on your project topic and goals. It can be showcased and incorporated into the capstone presentation.

Some examples of capstone project deliverables include:

- An experiment
- Organizing a community event
- An online or social media campaign
- Creation of a prototype model
- A survey or data-collection project
- A research publication
- Creation of a club or organization

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7. Presentation

For the culmination of the capstone project, you are required to create and give a presentation that shows your journey through your capstone project.

The presentation should showcase what you have learned and how you identified, researched, and created solutions to the real-world problem that is the focus of your capstone project.

You should create a slideshow that includes things like:

- Visuals—images, videos
- Tangible deliverables—models, papers, prototypes, experimental equipment, or setup
- The milestones completed throughout your project

It is essential that you take the time to **prepare and practice** for the capstone presentation and that you follow the **Capstone Presentation Rubric**.

The capstone presentations should be scheduled so that groups will have **10–12 minutes for their presentation** and **roughly 2 minutes to answer questions**.

This capstone presentation should ideally be given to educators, mentors, stakeholders, and community members. Prior to the presentation, **students should send out invitations to community members, mentors, and stakeholders requesting their presence at the capstone presentations**.

Domains	Exceeds Expectations	Meets Expectations	Nearly Meets Expectations	Does Not Meet Expectations
Content Student explains the process and findings of the capstone project and what they have learned	Clearly defines the topic and its significance Supports ideas with key points that are well-developed Provides evidence of exceptional research from multiple sources	Clearly defines the topic Supports with key points that are adequately developed Provides evidence of adequate research from multiple sources	Defines the topic Supports with key points that are somewhat developed Provides evidence of some research from a few sources	Does not define the topic Does not support key points No evidence of research
Organization	Introduces the topic clearly and creatively Maintains exceptional focus on the topic Includes smooth transitions to connect key points Ends with a logical, effective, and relevant conclusion	Introduces the topic clearly Maintains adequate focus on the topic Includes transitions to connect key points Ends with a logical and relevant conclusion	Introduces the topic Maintains some focus on the topic Includes some transitions to connect key points Ends with a conclusion	Does not have an introduction to the topic Maintains no focus Uses no transitions to connect key points Ends with a conclusion

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7. Presentation

Continued

Domains	Exceeds Expectations	Meets Expectations	Nearly Meets Expectations	Does Not Meet Expectations
Visual	<p>The purpose of the visual is clear and focused on the research topic</p> <p>Reflects a high degree of planning, design, and creativity</p> <p>Includes appropriate use of graphics and visuals</p> <p>Demonstrates knowledge gained through research</p>	<p>The purpose of the visual is mostly clear and focused on the research topic</p> <p>Reflect a degree of planning, design, and creativity</p> <p>Includes the use of graphics and visuals</p> <p>Demonstrates knowledge gained through research</p>	<p>The purpose of the visual is focused on the research topic</p> <p>Reflects some degree of planning, design, and creativity</p> <p>Includes some use of graphics and visuals</p> <p>Demonstrates knowledge gained through research</p>	<p>The purpose of the visual is not focused on the research topic</p> <p>Reflects a minimal degree of planning, design, and creativity</p> <p>Include minimal/no use of graphics and visuals</p> <p>Reflects minimal knowledge of research</p>
Delivery Student	<p>Effectively uses eye contact</p> <p>Speaks clearly and confidently, using suitable volume and pace</p> <p>Selects rich and varied words for context</p>	<p>Adequately uses eye contact</p> <p>Speaks using suitable volume and pace</p> <p>Selects words appropriate for the context</p>	<p>Uses some eye contact, but does not sustain</p> <p>Speaks clearly in some portions but not sustained, using a suitable pace</p> <p>Selects words inappropriate for the context</p>	<p>Uses no eye contact</p> <p>Fails to speak clearly and audibly and uses unsuitable pace</p> <p>Selects words inappropriate for the context</p>
Questions & Answers Student	<p>Demonstrates extensive knowledge of the topic by responding to all questions confidently</p>	<p>Demonstrates adequate knowledge of the topic by responding to all questions</p>	<p>Demonstrates some knowledge of the topic by responding to some questions</p>	<p>Demonstrates no knowledge of the topic by not being able to respond to questions</p>

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8. Reflection

As a reflection of the project, answer the following reflection questions:

1. What have you learned about the topic through your capstone project?

2. What have you learned about your future career aspirations and how this project has influenced any of your career interests and goals for the future?

3. What have you learned about yourself through this project?

4. What new skills have you acquired or improved through the project?

5. What challenges or obstacles did you face throughout the project and how did you overcome them?

6. If you were to choose to continue this project into the future, what are some steps that you would take?
What would be some new goals you would like to achieve?

Finally—You need to write and mail a thank-you letter or create a formal thank-you email to be sent to any mentors, stakeholders, or advisors who helped, guided, and advised you through this capstone project experience!