BA 5200
Course Product Assignment

Submission: Submit the project files to the designated area on Canvas.

Purpose:
This assignment is designed to give you the opportunity to work on a larger multi-team, multi-year project to develop an information systems product for a real-world problem/opportunity by incorporating concepts discussed in class and learned through your personal and collective research and reflection. You will be working on an open source project that will be refined over the next several years until it is ready for commercial use.

Instructions:
For this assignment, you will do the following over the course of the semester:

You will be work as a course to analyze, design, and prototype features for a personal wellness application that relies on Solid Pod technology to create an application where individuals can own and monitor their own wellness data. The application will provide a single point of access for wellness across multiple wellness dimensions. The product will span across various dimensions of wellness: physical wellness, nutritional wellness, mental wellness, social wellness, sleep wellness, intellectual wellness, financial wellness, and other dimensions that may arise during analysis with potential users or from your creativity.

Based on these broad dimensions, there are opportunities to work on tasks from various different industries (i.e., healthcare, finance, exercise/nutrition, education, etc.). You will break into multiple different teams, which will allow for teams to explore areas of the project that interest them the most. However, beyond interest, I expect the class to think strategically about the design and development of the system. If based on your analysis, it is not in the strategic interest of the product to prioritize certain wellness dimensions over others, I expect that your team formation and product feature selections will reflect your analysis.

Important Milestones and Due Dates:
You will be expected to complete ungraded milestones for this project to ensure that you stay on pace. **Failure to turn in the milestones by the due dates posted on the syllabus, unless otherwise negotiated with the professor, will result in a deduction in the final project grade.** Each late milestone listed below will result in a 10 point deduction on the final project grade. Late submissions of the final project report will be subject to late penalties as specified for assignments in the course syllabus.

The following pages contain the details for each milestone.

Communication Technology Decisions/Setup
Do the following to prepare for the Course Product Assignment:

1. Discuss with your classmates. Identify what communication and project management technologies you would like to use to facilitate communication and project progress monitoring. Your decisions must account for the following:
    a. I expect a high degree of Agile management practice, such as product backlogs/Kanban boards. In the past, Trello, Monday, and Jira have worked well for tracking course projects in an Agile fashion.
    b. You must use something other than email for communication. In the past, Slack or Discord with different channels has worked well for other groups. However, other solutions also exist, such as Teams. Teams hasn't been supported by IT in the past.
    c. The instructor should be able to access and view the communications and project monitoring software for individual teams and for the larger collective.
    d. The instructor will provide a GitHub repository to store code and pertinent documentation about the system. You do NOT need to create a new repository. You may want to consider other document sharing technology, such as Google Drive, for sharing documents that may not be ready for the GitHub repository or that may not end up on the GitHub repository.
2. Set up the technologies so that you can begin using them immediately. It is okay to change later in the semester, but a shift in technology often creates slowdowns in productivity while everyone learns the new system.

Course Project Charter (check the course schedule for the due date)
Do the following to complete the Course Project Charter milestone:

1. Discuss different Agile management approaches with your classmates and select some practices that you believe will help you run a successful project over the course of the semester. You don't need to get your structure fully fleshed out or perfect immediately. You will have reflection questions and should use continuous improvement methodologies to help you improve the management methodology throughout the semester.
    a. This process may be uncomfortable for some of you who are used to highly structured environments. You can be a great asset to your classmates in developing more structure. Use the discomfort to prompt positive changes.
    b. As future managers, you need to get used to developing and refining management structures. Some of you may be called upon to start up new divisions in the future.
2. Create a document that you will turn in to Canvas (one document for the entire class). Title the document **Course Project Charter**. Document at least the following:
    a. What values and expectations do you have for class members? What are your expectations of the leadership of individual teams and of the entire class?
    b. Describe how you will organize the many members of the course to analyze the problem domain; benchmark competitors; design, prototype, test, and refine a solution; and write a business case with a recorded idea pitch. You must use Agile management principles to govern the project. The following questions might help in detailing your response.
        i. What roles will be needed to manage the project across and within teams?
        ii. What teams will need to exist?
        iii. How will you spread expertise across teams?
        iv. How many people should you have on each team?
        v. Will team assignments be permanent or will they change throughout the semester? If they will change, why and under what circumstances?
        vi. Will some people belong to multiple teams or just one team?

vii. What skills will each team need?
viii. What roles will each team need?
ix. How will teams communicate with one another?
x. How will decisions be made across teams?
xi. How will you assign team members to different roles to take advantage of the different knowledge and skills each person possesses?
xii. How will you train team members on topics/skills they may need for the project (ex. database design, programming, interviewing, business model design, etc.)?
xiii. How will you produce quality and valuable deliverables efficiently?
xiv. How will you account for any knowledge and skill limitations your team faces during the semester?
xv. How will you handle conflict within and across teams?
xvi. How will you continually improve your management practices?

c. Create a list of each team with its members and meeting time availabilities.
d. Identify policies (i.e., expectations) for team members, such as policies for responding to messages, showing up to class, attending team meetings, etc.
e. Identify how you will handle violations of these policies and monitor individual performance. I will get involved when asked to manage conflicts, but this should not be expected at the end of the semester. If problems arise, address them promptly. Don't wait or avoid conflict; it hurts everyone involved.
f. This document should be revised throughout the semester as you revise your management practices. Assign someone (if you select a project manager or leadership team, this individual/group will be in the best position to update this document). You will turn in a revised copy at the end of the semester as an appendix of the final report.

Product Vision Document (check the course schedule for the due date)
Do the following to complete the Project Vision Document milestone:

1. Engage in discussions with your classmates to identify the parts of the product and the specific features that you think might be most beneficial to users. The following are criteria you should consider while trying to identify ideas.
    a. The features should be of interest to as many students as possible. You might not find a feature that everyone is excited about, but do your best.
    b. You should choose a topic that several people have experience with or knowledge of to help you make contacts with users/stakeholders and to spark initial ideas.
    c. You should have access (or be able to gain access) to individuals who you can interview to learn more about the topic and possible solution designs.
2. Create a document that you will turn into Canvas (one document for the entire class). Title the document **Product Vision Document**. Document at least the following:
    a. Introduction – describe the overall system and what it intends to do. Briefly identify what the solution and business model might look like and how it could meaningfully improve existing circumstances.
    b. Product Features – what are the key features of the product you will work on. User research will provide greater detail later.
    c. Users/Stakeholders – describe the users/stakeholders who would likely use the product or be affected by it. Describe the characteristics/demographics (this is just an educated guess at this point) of these different user groups. You will conduct user research later to test your assumptions. Describe the environment in which the users/stakeholders engage with the problem (again this is just early assumptions). You can refine this document later.
    d. This document should be updated throughout the semester. Again, you will want to assign someone or a group of people to keep this document up-to-date. The leadership

team or project manager might be a good choice for maintaining this document. A final copy will be added as an appendix to the final report.

Product Deliverables (check the course schedule for the due dates)
Because we are using an Agile methodology, you will turn in 5 deliverables (i.e., sprints) roughly 2 weeks apart throughout the semester. You will also have the final week of class to finalize the prototype, business case, and presentation. These deliverables are ungraded milestones to ensure that you remain on schedule to complete the expectations of the assignment. You will break down the work tasks that you need to accomplish throughout the semester into these deliverables. In doing so, you can practice managing complex, multi-team projects.

The tasks you must complete by the end of the semester, which you will divide between the deliverables, include (**NOT in any particular order; really do NOT pay much attention to the order of these tasks**):

- The product design and prototype must include data science focused features/components (e.g., data analytics, machine learning, data visualizations, artificial intelligence) in addition to other desirable features needed by users.
- Develop and continually improve management structures and policies to ensure the class works well together to analyze the problem domain and design and prototype the product.
- Develop a management methodology to allow for a multi-team systems development project.
    - Consider using a feature-based management approach where each team is in charge of a particular product feature. Students have had difficulties with traditional silo-based structures in the past. Be careful of silos. They can really slow things down.
    - You may need a dedicated IT infrastructure team to support all of the teams as you learn about the underlying technologies.
- Create a project plan for the completion of the product. You must use Agile planning (e.g., backlogs of user stories, Kanban boards, etc.). Agile methods will fit this project best because the time for work is short and the outcomes/design won't be clear from the beginning of the project. You can choose a hybrid planning approach if useful. Kanban boards, such as Trello can be useful for planning and tracking plans in an Agile manner.
- Identify product features that you can analyze, design, and prototype.
- Understand the problem domain and the users in the problem domain to design a customer-centered product. Be Agile. Don't conduct all interviews in one deliverable. Spread out the potential customer contact across all of the deliverables to maximize learning and feedback.
- Benchmark, in detail, existing solutions (IT and non-IT solutions) (both competing and complementary products) and the companies that provide them.
- Interview (NOT SURVEY) many diverse users/stakeholders (remotely (i.e., Zoom) or in person) to understand the problem domain (e.g., interviews, focus groups, etc.) and needs for a solution.
    - Each student must lead an interview with at least 3 people. The lead asks the questions. You may also choose to have another person present to take notes if you desire.
    - Early interviews might be unstructured, but later interviews should be conducted from a semi-structured interview protocol. The interview protocol will be turned in with the final report. Don't waste all 3 interviews using the same interview protocol. Don't waste all interviews in one deliverable either.
    - Tip: sometimes interviewing someone while they are engaging with the problem in the problem domain will give you the most detailed responses (i.e., observation + questioning).
    - Again, do NOT try to get your interviewing done all at once. In an Agile approach, you want to have regular contact with and receive feedback from stakeholders. It will be

better to spread interviews across the semester to ensure you are learning what you need to learn as the project progresses.

- Analyze the interviews and document important aspects of the problem domain. Examples of details include:
    - The environment in which people encounter the problem (e.g., at home, traveling, in the office, in quiet settings, in loud settings, etc.).
    - The specific frustrations/pain points they experience.
    - The causes of the frustrations/pain points.
    - What motivates individuals to engage within the problem domain in the first place?
    - The processes people go through within the problem domain.
    - Use diagrams to present your findings in an easily digestible format.
    - Empathize with the user to better understand their needs.
- Design an information system with analytics/machine learning capabilities that will solve the identified problem/opportunity.
    - Design as you interview and analyze the problem. Don't wait to start designing. In this way, you will use an Agile management approach.
    - Document the expected process users will go through when using the product (i.e., activity diagrams, business process & mapping notation, story boards).
        - Identify exception conditions that could cause the expected process to break down. Document how your system will help to redirect users back to the expected process.
    - A domain class diagram or entity relationship diagram demonstrating the various "things" in the problem domain that the system must keep track of.
    - A visual representation of the user interface, such as with Adobe XD, Figma, or even with hand drawn mockups.
    - Other diagrams that might be useful to explain the design of your system to teammates or other stakeholders. Relevant documents that do not provide details about individuals (such as interview notes) will be added to the GitHub repository for future classes to learn from.
- Prototype the information system.
    - Prototype as you analyze and design. Don't wait to create early simple prototypes (even early paper-based mockups). Use an Agile management approach. Get started as soon as you can. Don't be afraid to start coding by even Deliverable 1.
    - The final prototype must include working code.
    - You do not necessarily have to write the code yourselves, but many in the class will be able to contribute to coding. A programming textbook will also be provided for your reading. Be creative and consider how you could outsource parts of the coding to a Michigan Tech Enterprise, or outsource work to another course with a programming project, etc. Don't be shy and don't wait to do this. Many classes choose projects early in the semester. Managers have to be able to find and obtain resources. Act accordingly.
- Test the prototype with 80+ potential users.
    - Design a test or a series of tests to assess the quality, desirability, and user satisfaction of the product features and overall prototype.
    - Each person in the course should test a feature or the overall prototype with at least 2 people to give everyone the experience of getting user/customer feedback.
    - Document the users' feedback and suggestions.
    - Testing should happen throughout the semester as you continue to develop your prototype. Use an Agile management approach.
    - Based on collective feedback from prototype testing, refine and improve the feature or overall prototype. This should be an ongoing process. Don't perform all tests at the same

time. Spread them throughout the semester so that your prototype improves week by week.

- Develop a business case report to identify how you would commercialize the product and create a profitable company. Don't wait too long to think about the business model. Among other things, the business case report must:
    - Outline in detail the costs of maintaining the system (e.g., labor costs, management costs, infrastructure costs, etc.).
    - The plan should estimate reasonable sales forecasts and identify pricing strategies for the product to be viable.
    - If the product isn't enough to start an entire business around, document the other products and services you would need to provide as a company. These additional products should be included in the costs and pricing strategies.
    - At a high level, show me that you have a viable idea that investors would be interested in.
- Develop a professional idea pitch presentation with a demo of the software prototype. Record the pitch as a marketing tool. The pitch should be professional. It may be uploaded to the GitHub repository for public consumption, so plan accordingly.

Final Report and Presentation (check the course schedule for the respective due dates)
Write a business case report (i.e., a business plan) to highlight the commercializability of the product. Make sure that you prepare a high-quality report as it will account for most of the Course Product Assignment grade. You do not have to follow the structure below exactly if you find another format that you prefer. The report should at least include the information below. You can add more though.

You do NOT have to follow the exact outline below. If you have a preferred format for business case reports, please feel free to use it. However, you must have an executive summary.

1) Create a 15-30 page business case report to outline the product and your business model with at least the following (note this is a simplified version of a business plan):
    a. Well-written executive summary (1-3 pages; ~10% of paper length)
        i. An overview of the business idea
        ii. A brief description of the product
        iii. An introduction to the goals for the business
        iv. An introduction to the target market
        v. An introduction to existing competitors and why your solution will or won't gain traction in the market
        vi. An overview of the financial cost estimates and profit potentials
    b. Company Description
        i. Mission statement
        ii. Core values
        iii. Key goals
        iv. Introduction of the industry/market and the outlook for the industry. How and why will the product/business fit within the industry
    c. Product
        i. Describe the product you developed and any other complementary products/services you would offer if you started a company around the product
        ii. Identify the problem the service solves or opportunity that it exploits
        iii. Describe the product features that solve the problem and that provide a competitive advantage
            1. Include product documentation/screenshots/etc.
    d. Marketing

i. Size of the total market and market trends (i.e., expected growth trends of the entire market)
ii. Target market – describe the target market (such as detailed user profiles) in detail
iii. What percent of the total market is your target market and what are trends within that target market?
iv. Who are the major competitors in the market, how much market share do they hold, and how much market share do you reasonably think you can get?
v. What barriers to entry exist within the market/industry? How would you overcome them?
vi. How will you market the product to the target market?
vii. How much will marketing efforts cost?
viii. Detailed explanation of the pricing model with justification
ix. A reasonable one-year sales forecast. Don't assume you will have 100% market share. That isn't reasonable. Use sensitivity analysis to adjust assumptions to show a range of possible outcomes.

e. Operations
i. How would you continue to develop and refine the product and other related products?
ii. How will you ensure the quality of the product?
iii. What personnel would be required to further develop and maintain the product(s). Many companies hire individuals who simply work on open source projects.
iv. How/where will you "host" the product (e.g., Google Cloud, AWS, dedicated server from host, on site server)

f. Management
i. What would the management structure of the company look like?
ii. How would you find appropriate managers to fill in knowledge gaps?
iii. What advisors would you need (e.g., attorney, CPA, etc.)
iv. What would the organizational chart look like?

g. Startup Expenses and Financial Plan
i. How much capital would you need to start a business and sell a finished product?
ii. How would the needed capital be used (e.g., salaries, office space (if needed), contingency spending, etc.)? Break it down in detail, both textually and in tables. Tables don't always speak for themselves unless well designed.
iii. How long will finishing the development of the product take?
iv. Projections for profits and losses for the first 3 years of operation based on your previously outlined costs, market share, and pricing strategy. These projections should be very detailed based on costs, your pricing strategy, etc. Spreadsheets can be included as additional detail.
v. When will initial investments in product development and expected costs and revenues lead to a break even point?

h. Appendices (for the instructor's grading purposes)
i. All documentation/models you created when designing the solution
ii. Interview notes and other documentation
iii. Prototype screenshots
iv. Updated charter
v. Updated vision document

2) Prepare a pitch of your product/business idea along with a product demonstration. The pitch should be recorded via Zoom or another video recording/editing software. Make the video as professional as possible. You are welcome to outsource the video production if you can find

students in the humanities/marketing departments interested in helping with the production. The university library has some multimedia equipment that you could rent if you wish.

Grading Rubric:

Criteria	**Percent**	
Meaningful Features Identified	Excellent 10%	Based on the evidence provided, strategic or meaningful features were identified that could improve competitive advantage or add substantial value if implemented.
	Acceptable 8%	Based on the evidence provided, features were identified, but implementing the features would have minimal effect on competitive advantage or add only moderate value to users.
	Marginal 6%	Based on the evidence provided, features were identified, but the features have little value to the market and users.
	Not Acceptable 0%	Based on the evidence provided, features were identified, but the features are of no strategic or operational value and may even be detrimental to users.
Quality prototype, and business model	Excellent 50%	The designed solution is reasonable for the particular problem, context, market, etc. and could be commercialized with further effort. The business model and forecasts are reasonable for the market.
	Acceptable 40%	The designed solution is mostly reasonable for the particular problem, context, market, etc., but may not be particularly feasible or realistic for the context. The business model and forecasts are a little risky or unrealistic.
	Marginal 35%	The designed solution is unreasonable, infeasible, and unrealistic for the particular problem, context, market, etc. The business model and forecasts don't seem to fit the market well.
	Not Acceptable 0%	The design is poorly conceived and poorly described. The business model is nonexistent or highly unrealistic.
Good management practice employed	Excellent 30%	The class designed meaningful management structures and policies that allowed the product to be created efficiently and effectively. Continuous improvement was used to identify and rectify issues and strengthen teams and processes over the course of the semester.
	Acceptable 25%	The class designed mostly fitting management structures and policies that allowed the product to be created. Some continuous improvement efforts were used.
	Marginal 20%	Simple management structures and policies were created that helped to prevent complete chaos.

		Continuous improvement was only used on rare occasions.
	Not Acceptable 0%	Poor management structures and policies were created that led to chaos and poor results in the product. Continuous improvement efforts weren't used or were sloppily implemented.
Compelling writing and presentation	Excellent 10%	The paper includes a well written executive summary and has sections that have a logical flow. Ideas are clear, persuasive, and the writing is concise and grammatically correct. Financial analyses and forecasts are detailed and well explained. Headings are used to provide clarity. The recorded presentation was interesting and informative.
	Acceptable 8%	The paper has a somewhat weak executive summary, feels choppy and inconsistent at times, and contains grammatical errors. Headings are used to provide clarity. Financial analyses and forecasts are somewhat detailed. The presentation was mostly engaging and informative.
	Marginal 6%	The paper has a poorly written executive summary, lacks flow and consistency in writing, contains many logical and grammatical errors. Headings are not used. Financial analyses lack details. The presentation was somewhat dull and uninformative.
	Not Acceptable 0%	The paper appears to be separate documents haphazardly put together, and contains many grammatical errors. Weak financial analyses. The presentation was dull and uninformative.