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Issue 5 has six contributions to the field focusing in many cases on less-served populations, and seeking paths toward improved services and access. This includes mobile banking in Ghana, teaching cases on US rural health care and on design thinking to improve access to community services, and assessing online vs. on-ground IS education. Our final two papers renew our focus on IS education fundamentals, with attention to tool choices for spreadsheet education, and student perception of online tutors.

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The **Information Systems Education Journal** (ISEDJ) is a double-blind peer-reviewed academic journal published by **ISCAP** (Information Systems and Computing Academic Professionals). Publishing frequency is five times per year. The first year of publication was 2003.

ISEDJ is published online (<https://isedj.org>). Our sister publication, the Proceedings of EDSIGCON (<https://proc.iscap.info>) features all papers, abstracts, panels, workshops, and presentations from the conference.

The journal acceptance review process involves a minimum of three double-blind peer reviews, where both the reviewer is not aware of the identities of the authors and the authors are not aware of the identities of the reviewers. The initial reviews happen before the ISCAP conference. All papers, whether award-winners or not, are invited to resubmit for journal consideration after applying feedback from the Conference presentation. Award winning papers are assured of a publication slot; however, all re-submitted papers including award winners are subjected to a second round of three blind peer reviews to improve quality and make final accept/reject decisions. Those papers that are deemed of sufficient quality are accepted for publication in the ISEDJ journal. Currently the target acceptance rate for the journal is under 36%.

Information Systems Education Journal is pleased to be listed in the Cabell's Directory of Publishing Opportunities in Educational Technology and Library Science, in both the electronic and printed editions. Questions should be addressed to the editor at editor@isedj.org or the publisher at publisher@isedj.org. Special thanks to members of ISCAP who perform the editorial and review processes for ISEDJ.

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Teaching Case

Design Thinking: Facilitating Consumer Access to Community Services

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Abstract

The case focuses upon 1) a public health outcome, namely improving access to healthcare, 2) systems and design thinking approaches to software development and the internet of things, 3) mockup tools and user interface design, 4) understanding stakeholder requirements and feature requests, 5) presentation of a prototype application. This case presents a blend of healthcare management and technology concerns and is an appropriate capstone project for an undergraduate information systems course. Depending on the instructor's individual academic needs, the various assignments can also be modified for lower-level courses. The tasks were originally designed by one of the authors for a course called Creating Solutions with Integrated Technology and are used with permission.

Keywords: Design Thinking, Healthcare Outcomes, Internet of Things, Population Health Management, Public Health, Systems Thinking

1. THE PROBLEM

As part of a public health initiative, this August, McKeesport Mercy Hospital (MMH) is offering its second annual Community Health Clinic which will provide free physicals and vaccines for all ages. Last year's event was relatively successful, and the hospital's board is hoping to expand and build on it this year.

Greg is the head of marketing at MMH and has been charged with getting the word out so that as many residents as possible are able to take advantage of the clinics. He and his team have

developed several eye-catching advertisements for bus stops, billboards, social media, television, and flyers. They even added an option on the MMH website that allowed people to schedule their appointments electronically.

At yesterday's meeting, just before they wrapped up, Greg asked if anyone had any questions. Cara, the newest member of the team, spoke up. "I was looking at the feedback on last year's clinics, and a number of comments related to access and transportation," she said. "I know that this year we changed the hours to better accommodate working adults, which is going to

be a great help, but we aren't doing anything about transportation."

Before Greg could reply, other team members chimed in, dismissing Cara's concern.

"We can't do anything about transportation. It's up to them to find their way here."

"Exactly. There's public bussing, Uber, Lyft, and even jitneys."

"We're advertising at the bus stops. And we do have a shuttle, you know."

By the third comment, Greg held up his hand. "Let Cara finish." He looked at her. "Go ahead, what are you thinking?"

"The MMH shuttle is a good start in terms of providing a way out and back, but it's pretty limited since it only runs in a loop from the strip mall to the hospital. We know that there are other transportation options out there, but it's possible that not everyone knows what is or is not available. Or they may know about them, but they aren't sure how to hire an Uber or how to find a bus schedule or get to the mall.

"We added an app to the website to make it easy for people to schedule their appointments, we have QR codes on all of the print media, and we have a dedicated phone line for those people who don't want to use tech to make their appointments."

"What if we add an app that helps people find transportation? Like 'click here if you need a bus schedule' or 'click here if you want our shuttle schedule' or 'click here to go to the Uber website and set up an account.' There's a lot of possibilities here.

"Part of MMH's mission statement relates to outreach and helping the underserved. If we're going to do that, we need to recognize that one barrier for some people getting the healthcare that they need is reliable transportation."

Finished, Cara sat back and let what she said sink in. After a moment, Greg nodded. "You're right. An app that makes it easier for people to plan their trip can't hurt. We need to get our numbers up. The hospital is looking at public health outcomes and income, so the more patients we have, the better."

He looked at the team. "Go back over the demographics, look at our service area, and come

up with some ideas on how we can make it easier for people to get here. We'll meet Tuesday after lunch to figure out what we need our software development team to do."

2. DEFINING THE APPLICATION

Tuesday's meeting went without a hitch, and Greg was able to give software development team a clear picture of what they wanted in the application.

Application Requirements:

- Must be cross-platform
- Must be user friendly – the fewer the clicks, the better
- Should be intuitive but also easy for those anxious about tech to use
- Mapping option so users can see how to get to MMH from their homes – link to Google's map application but autofill starting and ending destinations?
- Links to outside transportation apps such as Yellow Cab, Uber, Lyft, and other local options
- Link to MMH shuttle – offer pick-up and drop-off times as well as locations (MMH & mall)
- Link to public transportation system
 - Specifically, link to busses that pick-up and drop-off at the mall and the hospital
 - Make sure that users know what bus fares will be, if they can pay in cash, or if a "electronic ticket" is required/an option

Features:

- Provide "best route" recommendations for users
- Recommend best travel options based on time of day
- Provides users a way to provide feedback on their experience with the application in finding transportation to a MMH health clinic

3. FIRST LAB ASSIGNMENT

View the following videos. The first provides a short overview of design thinking. The second and third showcase examples of successes and failures in both systems design and design thinking approaches to solving real-world problems:

- AJ&Smart's explanation: *What is Design*

Thinking? An Overview.
(<https://youtu.be/gHGN6hs2gZY>)

- Doug Dietz's TEDx talk: *Transforming healthcare for children and their families* (<https://youtu.be/jajduxPD6H4>)
- Elisabeth McClure's TEDx talk: *Are children really more creative than adults?* (<https://youtu.be/g00o6LCmaMI>)

Next, visit the landing page of the design-thinking website that provides a short explanation as to what design thinking is: <https://en.dt-toolbook.com/>.

Discuss why, or why not, some ideas work and others fail.

At the end of the lesson, you will be divided into teams of 3 or 4. Review the provided case once more, and produce a draft of what your team believes are:

1. The boundaries of the system/solution they will be creating a prototyping.
2. The operating environments of the system/solution.
3. The system components and interactions the system/solution will support.

4. SECOND LAB ASSIGNMENT

Next, you team will plan to conduct interviews to understand and examine the problem scenario from the end-user point of view. Your instructor will provide information regarding these interviews.

The overall objective of this assignment is to help your team develop an in-depth understanding of the problem.

To facilitate the organization and planning process, you are encouraged to use the Ask 5x Why questions found on *The Design Thinking Playbook* website (<https://en.dt-toolbook.com/tools>). The provided link takes you to *DT Tools*. Once there, you can download the "basic PDF template" *05_Question 5X Why* for free.

5. THIRD LAB ASSIGNMENT

This assignment asks teams to continue exploring the factors/items required for successful completion of the MMH project.

This assignment provides a more structured approach by asking the students to develop a

more specific interview plan based on the 5W + H model.

The 5W + H model focuses on identifying the following: what, who, why, where, when, and how. Consider using the free PDF template, *06_5WH Questions*, provided on *The Design Thinking Playbook* website (<https://en.dt-toolbook.com/tools>).

- **What:** What issue or problem are you exploring? What will your final result look like?
- **Who:** Who is (are) the user(s) you have identified?
- **Why:** Why is this an issue? Why it is important to solve?
- **Where:** What is the 'environment' this will be used. Ex. Web page, mobile application, kiosk, etc.
- **When:** When will the target market use this? What is our timeline?
- **How:** How will you solve the issue? Be sure to include at least four (4) actionable steps that you intend to take.

Your team will complete a 5W+H template and fully address each of the following for the issue or problem presented: what, who, why, where, when, and how.

Once the worksheet is completed, another interview is recommended.

6. FOURTH LAB ASSIGNMENT

This lab is designed to help your team make decisions, remove "analysis paralysis" barriers, resolve any disagreements, and focus on the best ideas toward a design solution for the project.

Your team will develop a minimum of five (5) "How Might We?" statements.

It is recommended that team members pay particular attention to the difference between requirements and features while brainstorming to ensure that the team is aligning solutions to the problem(s) identified.

Use the Planning Matrix provided in Appendix A. Your team should maintain and update the planning schedule throughout the remainder of the project.

7. FIFTH LAB ASSIGNMENT

At this point, review the project requirements, the problem identified, and the priorities that your team identified in the previous lab and complete the following matrix with components and requirements for the project (Appendix B).

Your team should maintain and update this matrix as necessary.

Once the matrix is complete, create a prototype of the application, following these steps:

1. Begin creating the physical prototype for the project.
2. Review and update their planning schedule and submit a completed version by the end of the week.
3. Meet with the instructor or problem sponsor to receive feedback and to answer questions.
4. Continue to make incremental improvements to your project.
5. Review and update the planning schedule.
6. Repeat steps 3-5 above for (3-week limit) until the final prototype solution is ready to be presented.

8. FINAL LAB ASSIGNMENT

Each team will create a presentation to highlight their project solution. They should target their presentation to the marketing team from MMH.

The following structure is recommended:

1. For the introduction, include the following:
 - a. Team Members + Photos
 - b. Degree/Major
 - c. Links to LinkedIn Profiles
 - d. How each team member's experience and/or background is relevant to the problem
 - e. Pictures of the problem sponsor.
2. Overview of your process: Problem Identification, Interviews, Observations.
3. Why is it important to solve this problem? – Include any research findings.
4. Planning Process.
5. Prototype Iterations – Include pictures of your progress.
6. Final Iteration (Where did you end up? What gaps remain?) – Pictures/Videos of the final iteration.

7. Lessons learned.
8. Demo of the final iteration.
9. Questions from the audience.

Presentations should be no longer than 30 minutes.

9. DISCUSSION QUESTIONS

In addition to questions covered during the final presentations, your instructor may ask some of the questions below.

Healthcare- and business-related questions:

- Imagine that you want to monetize this application. What businesses, other than healthcare, might find this useful and why? (SA)
- What are the benefits/drawbacks to offering applications for little to no charge? Why? (SA)
- If you choose to monetize this application, would you charge the end user or use ads to keep it free? Why? (SA)
- Summarize your key takeaways from this case study and describe how you have applied or plan to apply them in the business or healthcare field. (SA)
- Applications have little value if the targeted users are unaware of them. How would you market this particular application? Use Canva to create an advertisement that for your application (See Resources for links to Canva and free images). Be sure to include a QR code that can take them directly to the application itself.

IT- and IS-related questions:

- Are there other problems that an application such as this can solve?
- What are the advantages and disadvantages of a design-thinking approach and a systems-thinking approach? (SA)
- Imagine that you have unlimited money and time, what could you do to make this application better?
- Summarize your key takeaways from this case study and describe how you have applied or plan to apply them in the technical field. (SA)

Questions marked with an SA can be used as short-answer essay questions. Quality responses will demonstrate critical thinking and an understanding of the skills required to create the application and meet the project sponsor's requirements.

10. RESOURCES

Prototype/Mockup Tools recommended for this assignment:

- Balsamiq: <https://balsamiq.com>
- Invision: <https://www.invisionapp.com/home>
- Mockplus: <https://www.mockplus.com>
- Prototypr.io: <https://prototypr.io/toolbox>

Links for the First Lab Assignment:

AJ&Smart. (2020). *What is Design Thinking? An Overview*. Retrieved on March 17, 2023. <https://youtu.be/gHGN6hs2gZY>

dTP. (2021). *Intro to Design Thinking*. Retrieved January 10, 2023. <https://en.dt-toolbook.com/>

TEDx. (2012, May 19). *Transforming healthcare for children and their families: Doug Dietz at TEDxSanJoseCA* [Video]. YouTube. <https://youtu.be/jajduxPD6H4>

TEDx. (2019, January 8). *Are children really more creative than adults? Elisabeth McClure TEDxAarhus* [Video]. YouTube. <https://youtu.be/g00o6LCmaMI>

Link for the Second Lab Assignment:

dTP. (2021). *DT Tools: 05_Question 5x Why*. Retrieved June 13, 2022, from <https://en.dt-toolbook.com/tools>

Link for the Third Lab Assignment:

dTP. (2021). *DT Tools: 06_5WH Questions*. Retrieved June 13, 2022, from <https://en.dt-toolbook.com/tools>

Links for Canva assignment:

- Canva: <http://www.canva.com>
- The Noun Project (free images): <https://thenounproject.com/>
- Pixabay (free images): <https://pixabay.com>

APPENDIX A
Planning Mode

Feature/Requirement	Task Name	Description and Details	Who's Responsible	Status (OK, Doing, To Do)	Remaining Effort

APPENDIX B
Requirements Matrix

Project Requirements	Components Needed