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Prototyping AI-Powered Social Innovation in an Undergraduate MIS course

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Short Paper

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Abstract

While implementing with caution, Artificial Intelligence (AI) holds potential to help nations address pressing social issues, such as homelessness, climate change, and healthcare accessibility. With the existing and potential economic and social benefits of AI, it is crucial to integrate AI learning in undergraduate education. This paper presents the preliminary findings of a course project that engages students to learn AI by prototyping solutions to address important social issues in their communities among 120 undergraduate MIS students. Students worked in groups and developed chatbots that addressed a variety of community issues during COVID-19. A survey study shows students' enhanced understanding and mastery of AI concepts and applications, empowerment of contributing to their communities through AI innovation, and an emerging awareness of diversity, equity, and ethical issues in the community and AI technologies. We conclude with implications of learning AI, innovation, and ethics through the lens of AI for social good.

Keywords: IS education, artificial intelligence, social innovation, AI for social good

Introduction

Advances in Artificial Intelligence (AI) hold the promise of improving quality of life for many in our society through innovative applications in industries such as transportation, education, healthcare, agriculture (Tomašev et al. 2020). But these innovations will also require a dramatic reskilling of the future workforce as AI and automation take over human tasks and redefine work as we know it. The successful employee of tomorrow will require greater technological expertise and higher-order thinking skills (e.g., creative, critical, design, entrepreneurial) and be prepared to leverage AI-based technologies for organizational value. Meanwhile, countries around the world will also need creative solutions for both population growth and long-term sustainability. In 2015, all members of the United Nations (UN) adopted The Agenda for Sustainable Development, which included 17 Sustainable Development Goals (SDGs), as a call to action. Example goals include, Goal 1: No Poverty, Goal 2: Zero Hunger and Goal 8: Decent Work and Economic Growth. Recognizing how college graduates armed with AI skills could help achieve these goals, the United Nations Educational, Scientific and Cultural Organization (UNESCO) issued a call for investments in education in AI to promote sustainable development, also referred to as "AI for Social Good" (Keating and Nourbakhsh 2018; Tomašev et al. 2020). In response, universities have begun implementing AI for Social good (AI4SG) into their undergraduate curricula. For example, the interdisciplinary course "AI and Humanity" at Carnegie Mellon University aims to shape undergraduate students' societal consideration of AI (Keating and Nourbakhsh 2018). Similarly, Stanford University offers a course on the societal applications of AI. However, these courses are largely theoretical, provide limited hands-on experience and lack connections to students' own experiences and daily lives. Further, they provide limited opportunities to cultivate students' innovation and leadership capabilities. Information systems (IS) educators are also calling for greater AI educational opportunities for IS students (Ma and Siau 2019). However, this will

require a blend of prior approaches, a coverage of some of the technical aspects of AI plus an exploration of the societal applications and implications of these technologies (Ma and Siau 2019).

In this paper we test a new pedagogical approach to answer the following research questions: **RQ 1:** Can course-embedded AI learning modules teach IS students the fundamentals of AI while also engaging them in the creation of AI solutions to address societal needs in their communities? **RQ 2:** How do the modules achieve these learning outcomes? To this end, we designed and implemented our AI4SG project in a Management Information Systems (MIS) course among 120 undergraduate students. We present the development and assessment data attesting to the project's effectiveness in educating IS students on AI.

Related Work

AI Education

Providing a broad set of undergraduate students with AI education is not without its challenges. STEM programs at many universities provide valuable AI educational opportunities, however, these courses are often too technical to be taken by non-STEM students (Camilli and Hira 2019; Keating and Nourbakhsh 2018). Further, AI education in STEM fields may overlook non-technical aspects such as AI applications, innovation and ethics, indispensable competencies for AI practitioners, innovators and decision makers. So far, most AI education programs focus on AI's technical aspects with few considering AI's potential societal impact, Idea #5 of the "Five Big Ideas of AI" (Touretzky & Gardner-Mccune, 2022). Societal impact topics include: (1) the ethics of AI making decisions about people, (2) economic impacts of AI, (3) AI and culture, and (4) AI for social good (AI4SG). Given the potential of AI in solving societal problems, educators have called attention to teaching AI4SG (Keating & Nourbakhsh, 2018) to motivate students to relate AI technology to a diverse context in the society. Several top universities have started to implement AI4SG into the undergraduate curriculum, such as the "AI and Humanity" course at Carnegie Mellon University and the "AI for Social Good" undergraduate course at Stanford University. However, these courses mainly focus on existing applications and are not designed to cultivate students' innovation and leadership capabilities.

One type of AI technology, chatbots (Stieglitz et al. 2022), may provide a means of educating less technical students on the applications, benefits, and challenges of AI. Chatbot studies suggest they can benefit many in our society by providing support for public services, such as helping library patrons (Ehrenpreis & DeLooper 2022), supporting patients (Jameel et al. 2021), and guiding college students in career exploration (Lee, et al. 2021). Thus, chatbots may be an effective tool for teaching a wide range of students about AI while encouraging them to think innovatively AI4SG.

Design Thinking

Designing thinking, a user-centric approach to solving complex, poorly-defined problems that lack a "correct" solution, is widely recognized for its ability to foster innovation (Rauth, et al. 2010; Wrigley and Straker 2017). Design thinking "engages decision makers in experimentation, prototyping, observation, fast learning, visualization and the development of future focused outcomes that enhance the customer experience" (Benson and Dresdow 2015, pp. 381), skills highly sought after in business leaders. Indeed, design thinking has become popular in both undergraduate and graduate business programs due to its use in innovative firms and its recognition by the Association for the Advancement of Collegiate Schools of Business (AACSB) as a valued approach to problem solving (Benson and Dresdow 2015; Elsbach and Stigliani 2018). Research into design thinking suggests it may be particularly well suited to developing creative solutions to some of the world's most pressing issues as it encourages end user collaboration and fosters empathy, cultural awareness and civic literacy (Panke 2019). In particular, Yau et al. (2023) observed design thinking capabilities even among K-12 students when learning AI and thus proposed AI educators position young learners as active agents in AI learning centered around a design-oriented approach and real-life data sources.

Learning Modules

Learning Module Design

Part 1. Artificial Intelligence (AI) Labs for Technical Skills

We designed AI labs to achieve two goals: 1) to teach students AI fundamentals and applications through hands-on labs and 2) to empower students with the tools and confidence to leverage technologies to address social problems. Among the AI services offered by many high-tech companies, we chose IBM Watson – the AI services from IBM. In particular, we focused on IBM Watson Assistant, an AI-driven intelligent conversational agent platform. Similar to other chatbot tools, Watson Assistant requires students to know some foundational chatbot concepts, such as dialog, intents and entities, which help students practice computational thinking. Meanwhile, building a chatbot through Watson Assistant does not require coding nor does it require students to build the underlying machine learning or natural language processing. This no-code / low-code approach made Watson Assistant ideal for students without advanced programming or technical backgrounds. In addition, IBM Academic Initiative offers students at partner academic institutions free IBM Cloud Light accounts for at least one semester creating a free learning experience.

In Labs 1-5, students were guided step-by-step to create 1) a "Hello World" chatbot, 2) a chatbot by importing an existing chatbot, 3) a chatbot capable of answering user questions, 4) a chatbot that can ask users questions and 5) a comprehensive restaurant chatbot that can help a customer make an order. Labs 1-4 take about 30 minutes to complete; Lab 5 was adapted from a publicly available tutorial published by IBM and takes about 60-90 minutes to complete. In Lab 6, we introduced other IBM AI services, such as Natural Language Understanding and Watson Discovery, through demos and case studies. Lab 6 provides students with a broad scope of AI services to illustrate how chatbots fit within the broader AI landscape and to encourage them to explore opportunities for integrating other AI services into Watson Assistant.

Part 2. Design Thinking for Social Innovation

Design Thinking, a creative process that encourages designers to experiment, create and prototype models, and base redesigns on user feedback (Razzouk and Shute 2012), is a popular framework for social innovation (Selloni and Corubolo 2017). Although design thinking steps vary across versions, we began our research in Fall 2020 with the design thinking framework created by Stanford Design School. This framework includes empathizing with users, problem definition, and solution ideation, prototyping, and evaluation. In Spring 2021 we adopted the free online course, IBM Enterprise Design Thinking, which allowed students to learn at their own pace and to earn IBM Enterprise Design Thinking badge. The IBM Enterprise Design Thinking model summarizes the innovative problem-solving process in an iterative evolution of three components: observe, reflect and make. Students then used their in-class time to apply design thinking activities to develop their group projects.

After learning about both AI and design thinking through lectures and hands-on labs, students formed teams of no more than 5 members. The teams created chatbots to address important social issues during the COVID-19 pandemic by following six weekly milestones as assignments.

- Milestone 1: Identify a problem: choose, understand and decide on a problem through research and empathizing with users using the IBM Empathy Map
- Milestone 2: User scenario and conversational flow: write a user scenario based on the problem statement and design the chatbot's conversation flow
- Milestones 3 -5: Design: iteratively prototype a chatbot based on instructor and user feedback

Finally, the students presented their project pitches to a panel of invited industry judges. The chatbot presentations were evaluated according to the following criteria: 1) potential social impact, 2) design and feasibility and 3) originality. The judges provided students with real-world experiences and feedback while also giving us the opportunity to showcase students' work to community partners.

Learning Module Deployment

We implemented our learning module during the Fall 2020, Spring 2021 and Fall 2021 semesters in Digital Innovation, an MIS elective course that teaches the role of emerging technologies in organizations. In each semester, the AI labs in Part 1 were used as five weekly individual assignments during the first half of the semester. After students gained a solid understanding of the Watson Assistant chatbot, the five milestones of social innovation in Part 2 were deployed as in-class group projects followed by the final pitch competition during the last six weeks of the semester. For each semester, teams of no more than five students worked for five weeks to finalize their project topic, brainstorm project ideas, create chatbot prototypes and optionally evaluate their chatbots with end users.

The topic prompt for the Fall 2020 and Spring 2021 semesters was "chatbot-powered social innovation during COVID-19" with chosen topics including health support, small business support, election voting, online learning difficulties, student mental health, COVID-19 vaccine distribution information and homelessness. In Fall 2021, the topic prompt was "chatbots for accessible and equitable education during COVID-19" (adapted from IBM Call for Code Case Competition 2021). Topics included equitable education for students with ADHD, hearing loss, vision loss, international student needs, homeless students, and struggling youth. A total of 120 students created 24 chatbots for social good.

Evaluation Methods and Data Analysis

In Fall 2020, we investigated **RQ 1:** can course-embedded AI learning modules teach IS students the fundamentals of AI while also engaging them in the creation of AI solutions to address societal needs in their communities? As such, we assessed the project's effectiveness using a one-time, anonymous post-and-then-pre survey, administered via Qualtrics, that collected student perceptions of their post project knowledge as well as their recollections of their knowledge before the project began. This retrospective post-then-pre assessment method differs from traditional pre-test-post-test design in that both pre-test and post-test perceptions are collected at the same time using the same instrument (Drennan and Hyde 2008). Students provided their responses to the questions in Table 1, below, using a 10-point scale where 1 indicates low mastery and 10 indicates high mastery. Students were also asked two open-ended questions about any areas they like and could be improved upon.

Please give a rating to your Chatbot for Social Innovation experience on a scale between 1 and 10. **Q1.** I have a deep understanding about social issues during COVID-19. **Q2.** I have empathy towards people who suffer from the social issues during COVID-19. **Q3**. I know how to apply design thinking for solving problems. **Q4.** I know how to create a chatbot. **Q5.** I know how AI might help address some social issues. **Q6.** I have confidence in my ability to innovate.
Table 1: Post-then-pre assessment items Fall 2020

In Spring and Fall 2021 we distributed a qualitative, post-project survey to help us understand: **RQ 2:** How do the modules achieve these learning outcomes? The survey collected students' demographic information, such as age, gender, ethnicity and family financial status (i.e., whether they received a Federal PELL grant) and parents' highest level of education, and then asked the open-ended questions in Table 2.

● In what ways, if any, do you perceive the final project as connecting to your lived experiences? ● In what ways, if any, did the final project help you to reflect on the current needs, existing resources and/or interests of your local community? ● In what ways, if any, did the final project help you to analyze, critique and/or evaluate community issues that need to be addressed? ● In what ways, if any, was this final project able to help you understand how to use/apply AI to participate and/or improve community engagement and/or activism? ● In what ways, if any, did the final project help you to reflect on any issues of power, opportunity, privilege and/or marginalization within the community topic your group addressed? ● In what ways, if any, do you now perceive yourself as a contributor to systemic reforms (i.e., change in policies, laws, institutional practices) after completing this final project?
Table 2. Questions used in Student Survey in Spring 2021 and Fall 2021.

In Fall 2020 43/45 students completed the first survey. In Spring 2021 and Fall 2021 semesters, 45/75 students completed the second survey. For the Likert scale questions, we conducted a 2-tailed paired-samples t-test to compare the before and after measures for each question using IBM SPSS. For open-ended questions, we conducted a thematic analysis (Braun and Clarke 2006), a well-established qualitative data analysis method. We first read and re-read the collected qualitative survey data to identify codes and then organized these codes into themes. We then extracted survey data relevant to each theme. Finally, we iteratively refined the themes and their most representative survey data.

Findings

On average, the results showed a significant increase for students' agreement with the following statement "Q1. I have a deep understanding about social issues during COVID-19" from pre-test (M = 6.00, SD = 2.07) to post-test (M=8.83, SD = 1.34), $t(42) = -8.71$, $p<0.001$. Similarly, there is a significant increase for the statement "Q2. I have empathy towards people who suffer from the social issues during COVID-19" from pre-test (M=8.16, SD = 2.15) to post-test (M = 9.40, SD = 0.88), $t(42) = -3.89$, $p < .001$. Additionally, the increase in the mean response for the following statement: "Q3. I know how to apply design thinking for solving problems", was also significant from before (M = 5.09, SD = 2.40) to after (M = 8.74, SD = 1.27), $t(42) = -10.419$, $p < .001$. The results of these two statements indicated that students have demonstrated enhanced capabilities of finding important problems, emphasizing with users and finding solutions using design thinking. Additionally, students reported a significant increase for the statement "Q4. I know how to create a chatbot" from before (M = 2.05, SD = 3.08) to after (M = 8.95, SD = 1.25), $t(42) = -14.10$, $p < .001$. It is worth noting that students indicated the lowest rating of this question among all the six questions. This showed that students who had the least hands-on experience with AI than the other measures. Furthermore, the increased rating of "Q5. I know how AI might help address some social issues" from before (M = 5.30, SD = 2.58) to after (M = 8.88, SD = 1.24) was also significant: $t(42) = -9.54$, $p <.001$. Results of these two statements showed students increased confidence and mastery of AI technical skills on the aspects of AI chatbots. Finally, students demonstrated increased confidence in their ability to innovate (Q6) from M = 5.23 (SD = 3.04) to 8.63 (SD = 1.59), $t(42) = -8.17$, $p < .001$. This finding showed student overall confidence in innovation after this course project.

By analyzing students' open-ended questions, we found students liked how the learning modules were planned and administered. For example, a student wrote: *"The project we experienced was meaningful, useful and helpful in our career and as an individual. Applying real life situations and scenarios within this project is a beneficial experience that enriched my understanding on social issues and artificial intelligence. I also liked how our project was judged by industry professionals. It's a scenario that is similar to what work may be like in the technology and business industry*." The themes that emerged from student feedback were that they enjoyed the project's focus on 1) experiential learning of AI situated in their communities, 2) contributing to the community through AI-powered innovation, 3) learning the diversity of populations and AI ethics. We elaborate these themes in the following subsections.

AI Learning through a Community Lens

Some students chose to address a social issue that came from their **lived experience**. For example, one group focused on students (P7) with deafness because one of the student's family members is deaf and teaches students with hearing loss. Other group projects also found inspiration in the experiences of their family or friends. As P37 reported: *"This final project reminded me of the difficulty my community faces. Most immigrants don't have the privilege of going to school or learning about tech. They come to this country seeking a better life. Most immigrants come to this country looking for a job whether it is in restaurants, like my dad, or in landscaping like so many friends of my parent[s]. My parents always wanted the best for me so they worked hard and never had the time, money, or opportunity to learn about tech."* For other students, their decision of topic was inspired by people they knew before. For example, P21 shared that "*while I am not a homeless student, I have known a few homeless students that would have benefited greatly with the streamlined information our chatbot provided*" and P28 knew "*individuals who would have loved to have something like this for them when they were going through college applications.*"

For some students, their project topic was not directly related to their own lived experience, but they reported gaining more awareness about their **communities' needs.** As P8 wrote: *"It helped me reflect on the less privileged groups in the community that [have] lost their business and job due to [the] COVID-19 pandemic…it is great to have created a chatbot that can support these groups and provide them opportunities for reopening their businesses."* Similarly, P16 shared that "*Although none of us have been medically diagnosed with ADHD or ADD, we understand the importance of ADHD awareness. This medical condition could affect children at home, school and their relationships. We wanted to expand on not just those with ADHD, but also individuals who have trouble paying attention in class, causing them to fall behind their classmates.*"

The project allowed students to learn more about a wide range of issues in their communities, such as homeless students (P4) and visually impaired people (P5), people who are deaf (P7) and international students (P8). As P8 wrote: "*This project helped me reflect on the needs of international students and how processes can be improved to help with someone's academic journey*." Students reported that they gained a deeper understanding about community needs through further research on the target users. Similarly, P28 agreed that "*This project, at the very least, brought awareness to the issues of kids not knowing how to properly ask for help or not having anyone they could comfortably turn to*." Students also expressed an increase in empathy for others in their community, *"After doing research, we found that many students have ADHD and many more students are undiagnosed [and struggling] with ADHD*" (P16). Similarly, P27 was able to gain more awareness about community needs through empathy. "*The project really helped me envision myself as a student who is struggling in school and may or may not have an unstructured home life that is affecting their ability to function well in school.*"

Students also gained experience in **analyzing, critiquing and evaluating community issues** by examining existing solutions for the problems they identified. Some students discovered they were unaware of the many available resources For example, P11 shared that "*It is enlightening to know that there are many free platforms as a service that explore and offer help to some of the communities that are considered as minority. It was a great experience to have the opportunity to work and analyze that to bring a proper, refined solution to a particular community*." Other teams noted the scarcity of resources for their topics. As P16 put it, "*the school systems do not cater to non-traditional learners and praises students for retaining and regurgitating information*." P24 realized that comparatively, "*there is a lack of resources for the youth*" and P25 shared that "*we were able to reflect on what we lacked as younger students and look at what we wish we had back then*." While exploring their topic of ADHD, P3 started to question "*why ADHD is becoming so common in kids and how they are struggling*" and his/her teammate, P15, noted that "*before this, I had knowledge on the issue, but I never knew that there weren't many solutions to provide assistance for ADHD students*." Similarly, P20 realized "*how there are communities such as the deaf community that simply are pushed through mainstream education and have a very hard time learning on their own*."

AI Innovation for Social Change

Students reported that the project helped them gain an **in-depth understanding of AI technologies**. Students like P11 appreciated seeing different types of AI technologies throughout the project. "*It introduce[d] me to some of the tools that not only help other users… but also myself as there are many variations of tools that offer and embrace inclusion, diversity and transparency. For example, …translation [tools]…connected with me as I know and understand the language barrier as an immigrant*." They also sharpened their skills in building a chatbot using Watson Assistant, as P12 said: "*The final project helped me understand how AI can be used to provide a service while making it as seamless as possible. IBM Watson Assistant had many different features that we implemented to assist international students*." Some students appreciated the hands-on nature of the project, "*This project helped me apply the lessons we learned in each milestone, building up to creating our own chatbot… It helped reinforce the ideas of intents, dialogues and entities" [P28].*

Furthermore, students reported feeling empowered to create **social innovations using AI technologies**. For example, P10 noted that "*This project made me realize how significant AI is in efforts to help community engagement and how positively impactful it could be if done right*." Students noticed some of the benefits of a chatbot include the availability, e.g., "*Technology can really boost the deaf community in the way that they can get equal access to education 24/7 and from wherever they need be*" [P20]. Watching other team presentations also helped students see how AI can address a wide range of social issues, as P15 reflected: "*The final project was able to help me understand how beneficial AI can be if used correctly to help with most issues*." The synergy effect is also reflected in P15's comment: "*Through watching and participating in these projects, I realized that we can utilize AI for good to help communities come together*." Students reflected that the methodology and AI tools they learned in the class allowed them to use AI for social good after finishing the class. "*Using this AI has made it accessible to anyone to address any issues. If there is something I am very passionate about, I can create something similar to this project and showcase it in a competition*." -P6

Many students felt a sense of fulfillment by **contributing to their community**. For example, P21 shared that *"As a strong advocate for helping homeless students, our chatbot allowed me to put my passion to*

use and hope to help students in future." P20 also believed that *"the local deaf community can really be benefiting from this project as the kids can get equal access to education via our assistant."* Similarly, P45 wrote: *"I didn't consider myself to be a contributor before this class. Now, I can confidently say that I attempted to streamline the university's website infrastructure to assist students' learning process."* As an underrepresented minority, P32 reflected, *"I am a first-generation Latina in MIS, that alone I feel somewhat makes me a contributor to systemic reform. However, this project gave me new tools and knowledge that I could share with my own community. The final project itself provided me [with the] knowledge and tools that could help several small Latinx businesses."*

Diversity, Equity, AI Ethics

Students reported a sense of increased awareness of diversity and equity issues, including empathizing with "*marginalization of homeless students in the community*" (P4), realizing that "*the deaf do not have the same opportunity as people with all working senses*" (P7) and learning the *"perspectives of students with ADHD*" (P3). In particular, P16 wrote that "*for someone medically diagnosed with ADHD, they have an unfair disadvantage for success compared to their peers. ADHD can make it more difficult to control their behavior; therefore, they are often in trouble with teachers. This rises the problem of unfair punishment or inappropriate discipline in the American school system, which makes ADHD students disengaged with school and push them towards a troubled life*." In addition to realizing the diversity of users in the community, students also started to think about the equity gaps. As P25 shared, "*this project definitely opened my eyes to seeing the opportunity differences in different areas of San Jose. In the more wealthy areas, there are a lot more resources for students. However, in low income areas, some students would have to take a 20-minute drive to their closest library*." Students also pointed out the privileges they had that they might not have realized otherwise, as P10 reflected, "*Oftentimes, we do not acknowledge our privilege if we have never struggled with the issues and complications as certain community groups*." Through this project, P20 also realized that "*not everyone is privileged to have access to education so there needs to be accommodations for everyone*" and P12 reflected on the issues of equity gap between international and domestic students: "*I did not realize that international students have to complete additional steps for employment and education*."

Even though this project does not directly ask students to discuss AI ethics issues, students' awareness of diversity and equity issues emerged as themes in the survey responses and could serve as a foundation to discuss AI system bias and transparency. For example, when reflecting on the impact of their AI-powered solutions, P7 noted that "*AI is a great way to utilize technology to do things beyond human capabilities. I think it is great to know and use it but also keep in mind there are biases and disadvantages coming with it*." In the future, we plan to integrate modules to engage students to actively reflect on how the diversity and equity issues impact their decisions in designing AI systems.

Meanwhile, students also offered some suggestions based on issues they encountered. First, students suggested the labs employ AI tools that better support collaborative work. At the time of implementation, Watson Assistant did not provide collaborative chatbot building, which created some teamwork challenges. Second, students suggested more team-building activities before and during the group project to better integrate students' identities and community assets and make collaboration smoother.

Discussion

Our study aims at exploring the impact of AI education through the lens of AI and social good, identified as an important and yet understudied area based on the "Five Big Ideas of AI" (Touretzky & Gardner-Mccune, 2022). Our preliminary findings offer evidence on the benefits of learning AI through the lens of social good. Some educators are starting to integrate AI ethics to their curriculums, such as the prevention of existential risk to humanity, the impact of AI technologies on privacy, the impacts of bias in AI, and the development of AI systems that meet the ethical standards (Forsyth et al., 2021). Although critical and timely, ethics-focused AI education emphasizes preventing the potential negative impacts of AI rather than promoting its potential societal benefits.

Empowering AI innovation with community assets. Students appreciated the opportunities to learn AI through a community lens. In particular, project-based learning that is situated in their lived experience motivated students to relate technology with the critical needs in their communities. In particular, in order to better address the needs through a techno-social method, students further reflected and researched on

their community needs by examining the existing solutions and gaps. This opened up more opportunities for them to leverage technology to serve their communities. Different from existing work that teaches students AI's impact on society by examining existing systems created by others, our findings showed that students have the capability and inner motivation to learn about AI and society through their own cultural and community assets, which seems to be more relevant to students. This is reflected in culturally responsive computing (Scott et al., 2015) which suggested that situating computing education around learners' cultural assets may lead to positive academic and motivational changes and innovation.

Learning AI diversity and equity from the community. Interestingly, we also noted enhanced student understanding of diversity and equity issues within their communities, an important theme in AI ethics education (Touretzky & Gardner-Mccune, 2022). Different from the current methods that teach AI ethics through a theoretical framework (Crampton, 2022), we found that students appreciated learning about diversity issues and equity gaps first-hand by investigating their own communities. Teaching AI ethics and design via students' lived experiences, communities and cultural assets is likely to provide richer experience in teaching AI ethics and may be a promising addition to the AI ethics theoretical lens (Scott et al., 2015), which we will further investigate in the future.

Conclusions and Future Work

This paper presents our preliminary findings of a course module that trains students to create chatbot-empowered solutions for social issues. Over the course of three semesters, our 120 undergraduate business students found the learning module and final project meaningful and rewarding. They appreciated the opportunity to learn more about others' needs, gain hands-on AI skills, contribute to their communities through AI innovation, and learn about biases in AI systems. Our approach to teaching AI4SG and design thinking may be integrated into other MIS courses and need not be limited to issues that arose during the pandemic. In fact, we have employed this approach to address sustainability issues and used other AI platforms, such as Juji Studio, with great success. We believe our approach could be replicated in a variety of situations and environments. However, students will likely benefit most from a focus on local or regional issues as these will provide them the opportunity to interact directly with potential users of their solutions. Although our modules were implemented in online courses, we believe they could be added to in-person classes with equal success. Our work is not without limitations. First, our work could benefit from an assessment of both quantitative and qualitative data. Second, we focused on one type of AI technology – chatbots – using Watson Assistant. Further implementations could integrate more AI technologies, such as generative AI using Juji Studio. Lastly, future implementations of our project will include more lessons on AI ethics.

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