Intelligent Career Advisers in Your Pocket?

A Need Assessment Study of Chatbots for Student Career Advising

Emergent Research Forum (ERF)

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Abstract

Supporting student career readiness has been a major goal for the business college. Students frequently face challenges in seeking sufficient career advising support on campus due to the low advisor-to-student ratio. As one of the artificial intelligence and conversational technologies, chatbots have gained an increasing amount of attention in recent years. We aim at leveraging chatbots to offer accessible and personalized career advising services to college students. As the first step, this research in progress reports a need assessment study of a chatbot-based intelligent career advisor. We first developed a chatbot as an experimental platform to interview its potential advisees – college students. Through a chatbot-led user study with 350 undergraduate students, we found chatbots could potentially provide four levels of career advising services: offering information and recommendations, providing intervention on career development, augmenting career counselors' work, and providing career counseling. We then pointed out areas of challenges and future work.

Keywords

Chatbot, conversational agents, student success, artificial intelligence.

Introduction

Helping students prepare for their career is one major task for business schools, besides educating them on the fundamentals of their areas of study (AACSB 2018). However, college students commonly face barriers in accessing career advising services and resources on campus, such as navigating campus services, seeking timely career advising support, and keeping track of the career planning pathway (NACE 2016). It can also be challenging for universities to offer personalized career advising for every student due to the low adviser-to-student ratio. Currently, universities have started to address some issues using information technologies, such as online communities for job posts and software for mock interviews. Meanwhile, the advancement of conversational agents (Luger and Sellen 2016), such as chatbots (Schlesinger et al. 2018), has provided promising opportunities for career advising in higher education (Goel and Polepeddi 2016). The term "chatbots", coined from "chatting robots", refers to intelligent machines that are able to conduct text-based conversations with users. Chatbots are receiving an increasing amount of attention in the past five years with the development of natural language processing and deep learning. Originally integrated in messaging applications (e.g., Facebook and Slack) and then for customer services, chatbots are also used for answering questions, providing information, and offering interactive support (Jain, Kumar, Kota, et al. 2018). However, how to leverage chatbots for career advising is understudied. Therefore, we aim at designing chatbots as an intelligent career adviser that college students can turn to anytime at any place. As the first step, this research-in-progress presents the findings of a need assessment study of chatbots to support students' professional development.

We designed and built a chatbot called "*Sammy*" as an interviewer to investigate its potentials for career advising (see Figure 1). We conducted a user study with 350 undergraduate students at a large public university in the United States who completed an "interview" (i.e., a chat) with Sammy. We found four potential career services that chatbots could offer: providing information and recommendations, offering career readiness intervention, augmenting counselors' tasks, and providing career counseling.

Related Work

Conversational agents have started to grow in popularity on various industrial platforms. As one of the conversational technologies, chatbots have primarily been used for commercial purposes such as customer support (Johannsen and Florian 2018). Recently, researchers started to extend the value of chatbots to facilitating collaboration (Avula et al. 2018), enhancing work performance (Williams et al. 2018), and promoting healthy lifestyle (Schroeder et al. 2018). Chatbots are also leveraged to deliver services to underserved populations. For example, *FarmChat* (Jain, Kumar, Bhansali, et al. 2018) was designed to help farmers in rural India better access information; *Consejero Automatico* (Wong-Villacres et al. 2019) aimed at supporting Latino parents' educational engagement. Prior work also explored the benefits of using chatbots in higher education. Currently, chatbots are mainly used in the education of health and wellbeing, language learning, facilitating feedback and metacognitive thinking, and asking students challenging questions (Winkler and Soellner 2018). As an example, *@dawebot* trains students in learning through multiple-question quizzes (Pereira and Juanan 2016). Taking it further, Georgia Institute of Technology piloted a chatbot called *Jill Watson* that serves as a teaching assistant who answers student questions in an online course (Goel and Polepeddi 2016). Beyond learning, a few universities have deployed chatbots to support student life. Pounce (Daniel Peterson 2016) helps first-time students transition to and enroll in Georgia State University. The chatbot can answer students' questions regarding enrollment and financial aid and also has the capability to remind students who haven't finished portions of their enrollment process.

In IS research, researchers have demonstrated the importance humanness represented in typing speed, typefaces, emoji of a chatbot during the conversation. Studies have indicated the importance of relevance, presence, and engagement of chatbot conversations (Schuetzler et al. 2018), as well as the support of users' autonomy, competence, and social relatedness (Sidorova 2018). In general, chatbots might make services more accessible, available and affordable (Følstad et al. 2018). However, how chatbots can be used for career advising in higher education is understudied. Therefore, we aim at leveraging chatbots to design and create an intelligent career advisor that college students can turn to anytime at any place.
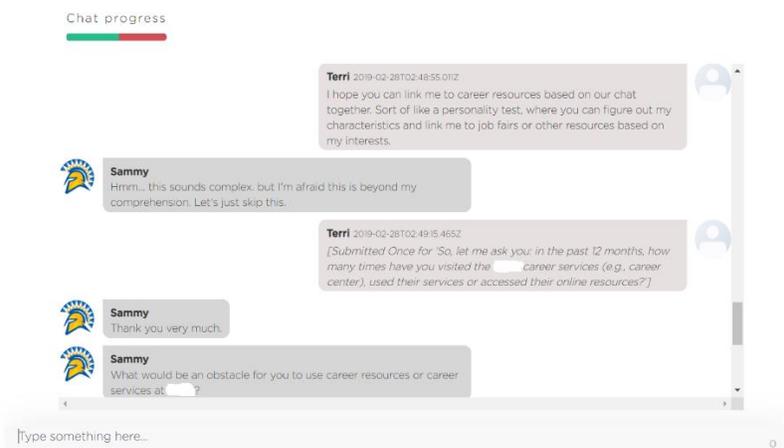
Figure 1. Screenshot of the interface of the chatbot used in the need assessment study

Methodology

We conducted a need assessment study on how college students might use chatbots to support their career development. To fulfill this goal, we designed and built a chatbot named *Sammy* as an experimental platform to conduct chatting-based "interviews" with students. We chose to conduct chatbot-led interviews for three reasons: first, chatbot allows us to collect students' feedback in an efficient way compared with

human-led interviews; second, chatbot-led interviews are more interactive than surveys and thus more likely to solicit quality input from students; third, it helps students experience chatbots, especially for those who have limited knowledge about chatbots. We designed the chatbot questions after consulting campus career counselors and were around two aspects: 1) students' current practices, needs, obstacles, and expectations of professional development and 2) how chatbots might provide career support. After carefully designing the language to be colloquial and cheerful to engage students, we then developed Sammy using services provided by Juji Inc.[1], a company that allows users to create chatbots for personalized needs. We recruited participants from eight upper-division undergraduate MIS classes. They could participate in the "interview" on their own laptop or smartphones at a place of their choice. The interview takes approximately 15 minutes. The study was approved by the university's Institution Review Board.

Preliminary Findings

We collected chat results through Sammy from 350 business student participants of different concentrations (e.g. marketing, accounting, finance, management, MIS). The 350 participants include 189 males and 144 females, with the rest didn't feel comfortable revealing. The participants are primarily juniors (N=138) and seniors (N=206). Most of the students (N=308) were full-time students taking four or more in the semester. We then conducted a thematic analysis using the grounded theory approach (Öhman 2005). Two authors performed open coding for collected data and iteratively derived themes through three rounds of discussion. In this research in progress, we focus on presenting findings on how chatbots might assist in career advising. The complete results of other questions are presented in another paper.

Offering Information and Recommendations

Many students proposed that the chatbot could be helpful in answering questions they may have regarding university life. Participants provided examples of questions they would want answers to, such as important paperwork and its due dates, registration deadlines, and school holidays. In addition to requesting answers, participants would also like the chatbot to redirect them to resources helpful to their career development through URLs or through connection to a search engine. Other participants took it a step further and proposed that the chatbot act as a search engine with the functionality to provide career tips and career ideas. One student wrote, *"… I would suggest [the] chatbot to function as a search bot. Maybe help provide recommended positions to apply for given your interests and major."* Students also suggested that the chatbot could be capable of recommending career resources based on their conversation with the chatbot. For example, a student described, *"Ask the user what classes they enjoy, or classes they are doing well in, and provide career recommendations based on the class content or similar information."* This participant proposed that the chatbot have the ability to recognize what area the student is good at in based on their answers to questions. Other students also replied with a similar concept in mind, but suggested the chatbot ask questions that could help the chatbot generate resources for job application.

Providing Intervention on Career Development

On top of offering information and recommendations, many students wanted the chatbot to intervene in their career development. One intervention method proposed was that the chatbot provide students with career resources and remind them of upcoming career events. Some commonly stated career events include career fairs and career workshops (e.g. resume building, mock interviews, networking). A participant suggested, *"For a chatbot, I think the most helpful task in assisting my career development would be reminders of job fairs and the company list of attendees and if it correlates with my interest. These job fairs can be hosted by [name of the university] or reputable, local job fairs."* The participant explains that the reminders should be relevant to students in some way, such as students' interests. Other students suggested resources and reminders should be given based on the students' personality or major, which the chatbot would be programmed to figure this out through conversation. The second intervention method recommended by students was goal tracking. Some students want to have the chatbot track their progress on their career goals. A couple of major goals being graduating from college and obtaining a job after graduation. A student expressed, *"discover my goals, track them, and keep me motivated to reach them*

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[1] Juji Inc. Juji Inc. https://juji.io/

with scheduling and reminders." Goal tracking is very similar to reminders; however, goal tracking has a higher level of intervention because the chatbot will monitor a student's progress and remind them of self-set due dates. The third intervention method proposed by participants were to have the chatbot assist students for job preparation. For students, some ideas of job preparation include resume assistance, mock interviews, and tips on the formation of professional websites. One participant explained, *"[The chatbot can help] by providing insight to job openings and internships for my field that I could be a candidate for as well as providing resume assistance or even help with LinkedIn setup to make our pages look professional and attractive."* Many students were particularly interested in the chatbot giving tips on resumes and running mock interviews to prepare for internship or job offers. The above-mentioned interventions are increasingly more active. The first type is the lowest level of intervention because the chatbot only provides reminders to career resources. The second type has a mild level of intervention through goal tracking. The last type has the highest level of intervention through actual assistance for career development mainly regarding resume and mock interviews.

Augmenting Counselors' Work

Many participants recommended that the chatbot be a medium between students and advisors. As a medium, the chatbot could connect students to career or general school counselors. A student, Lance, wrote, *"Tell me the right people to contact about when I have a question about finding a job. Like if I need help with a resume who do I go to? What about finding an internship that is right for me or working on my LinkedIn."* In addition, some students want the chatbot to have access to the appointment systems for counseling so it can help students match their schedule to available appointment times. Some participants like John add more to this suggestion, *"You could be used to schedule an appointment to give the advisor a head-ups about what the student wants."* John takes it a step further from the common reply by proposing that the chatbot could help counselors understand a student's needs before the student comes in. In this way, the chatbot can potentially benefit both advisors and students.

Providing Career Counseling

Besides augmenting human tasks, such as directing students to a counselor, students recommend the chatbot to function as an intelligent counselor. If the chatbot were to be a counselor, the chatbot should be able to recommend courses to take for graduation, give career advice, and track students' progress. Jake wrote, *"I think this chatbot can be more useful for advising students on which classes they need to take and how to graduate in 4 years. Although [the university] is a 4-year institution the average graduation rate is about 5 years and I believe this is due to the low number of advisors there are and the availability of academic advising to students."* Jake describes the possible functions of a chatbot counselor and supports his reasoning with the issue of impacted counseling appointments, which could be alleviated with a chatbot acting as an advisor. This suggested functionality is unique because students are suggesting that the chatbot function as a human.

Conclusions

This research in progress aims to understand the opportunities in using chatbots to support the career development of college students. We created a chatbot to interview student participants around this question. After conducting and analyzing chatbot-led interviews with 350 college students of a large public university, we found out that chatbots might be used to offer information and recommendations, provide intervention on career development, augment career counselors' work, and provide career counseling. By integrating these services, chatbots have the potential to provide "just-in-time" personalized career services anywhere. In the future, we will continue to analyze the interview data to further understand the benefits and potential challenges of using chatbots to support student career development. Further, we plan to gradually build an intelligent career coach with the suggested functions based on our findings and then conduct user studies to evaluate the effectiveness of this intelligent career advisor.

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