Chatbot Use in an Online English Composition Course: A Qualitative Study

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Chapter One: Introduction

Introduction

This study will explore student and instructor perceptions of pedagogical chatbot implementation in an online undergraduate English Composition course. With the COVID-19 pandemic of 2020, many higher education institutions, along with K-12 educational systems, moved to exclusively online courses to maintain social distancing and provide safe virtual spaces for learning and teaching (Burgess & Sievertsen, 2020). Before the hasty conversion to online education, there was already an increase in remote instruction in higher education with a rise in institutions providing online and blended courses and even full degree programs (Jarvie-Eggart et al., 2019).

While studies show that students enrolled in online courses actually prefer face-to-face courses, enrollment continues to increase (Tichavsky, 2015). This rise in registration may be attributed to increased availability through social distancing necessity, more course offerings, or because of the convenience that online schedules offer students. Most students who work full-time or have lifestyles that require versatility appreciate the flexibility and opportunity online education affords (Berry, 2018). The asynchronous communication inherent in online courses provides flexibility, but there are also issues in communication (Kelly, 2017). These issues in communication can impact students' affective learning, motivation, and cognition (Baker, 2010). Moreover, students enrolled in online courses often feel isolated (Berry, 2018; Forbes, 2019; Huang, 2019) and can lose motivation. The lack of immediacy in asynchronous communication may be solved by the use of a pedagogical chatbot for the course.

Statement of the Problem

The unavailability of instant access to the instructor leads to the impression of instructor absence and that the content must be self-taught (Tichavsky et al., 2015). Furthermore, students taking courses online may feel somewhat detached since they often work alone at a computer and have to wait more extended periods of time for feedback and responses than in a face-to-face course (Berry, 2018). Pedagogical chatbots may alleviate this issue by interacting naturally with learners and through scaffolding students' understanding, much like educators do (Winkler et al., 2020). While students enrolled in distance learning may feel isolated and prefer immediate feedback, research shows students prefer timely asynchronous communication over face-to-face meetings (Li, 2011). Pedagogical chatbots can offer instant feedback to questions while compiling a list of common inquiries for the instructor to act upon either through whole-class communication or revision of methodology.

Although studies do show mixed results for chatbot use in English language acquisition courses (Bii, 2013), the researcher found no studies presenting the perception of pedagogical chatbot use in English Composition courses. Particularly in the current pandemic climate where most courses are required to go fully online until social distancing is no longer required, a study to determine the perceived benefits of pedagogical chatbots is essential to the scholarship on online course communication. Such information may be used by higher education instructors to supplement or enhance their courses.

Purpose

The intention of this study is to explore the perceptions of students and their instructor of pedagogical chatbot use in an online undergraduate English Composition course. In order to generate substantive theory, this reflexive study will use a flexible, emerging design. Data will

be accumulated through chat transcripts and nested saturation/redundancy sampling with open-ended interview questions that will take place through one-on-one telephone or virtual conferences.

The following research questions drive this emergent, grounded theory, qualitative study.

1. What is the student perception of the use of chatbots in an online English composition course?
2. Why do students who use chatbots in their online English composition course choose to do so?
3. What is the instructor's perception of the use of chatbots in online English composition courses?

Literature Review

Online Learning and Communication

There seems to be a hierarchy of modalities for success rates in online learning. In a recent study, face-to-face first-year English courses, similar to what this study intends to research, achieved the highest passing rate with at-home, asynchronous video learning earning the most failures. (Bourdeau et al., 2018). This may be attributed to the absence of interactivity. Research is concluding that in online courses, especially between student–instructor, interactivity plays an important role in student satisfaction and resiliency (Croxton, 2014). Blended courses, focusing on student transition and "comfort" with the online portion of the course, are the most successful of online modalities (Futch et al., 2016).

Communication is important to students. However, even in face-to-face courses, students remain uncomfortable seeking assistance in face-to-face interactions with their instructors. In a fascinating study, Li et al. found that, when participants were offered face-to-face office time,

virtual office hours, or an email-turnaround-time guarantee, the preference fell on the latter for communication (Li et al., 2011).

Isolation

Because online courses are asynchronous and solitary, they can be isolating. Students participating in distance learning cite a perceived absence of instructor-student interaction as the main reason for face-to-face course preference. Lack of instant access to the instructor leads to the feeling of no instructor. This is coupled with a sense of teaching oneself the content (Tichavsky et al., 2015). Also, students perceive isolation because of the reduced pace and lack of instant response inherent in online learning (Berry, 2018).

Online students might also be disadvantaged by limited access during "office hours." In face-to-face courses, access to the instructor is immediate and allows students to receive clarification about assignment content and execution. However, in distance learning, the instructor must define ranges of available hours to provide proper access for students to have their questions answered. Since an instructor must limit availability to specific days and times, some students will inevitably have conflicts with those hours of availability (Wingo et al., 2017).

Chatbots

Chatbots are a novel technology. A chatbot, also known as a conversation agent, virtual assistant, or virtual agent, is a technology taking the form of mobile messaging or as a computer or web program using natural language processing, thereby simulating the conversation of a human. These programs process natural voice or textual input and offer an appropriate response (Georgescu, 2018). Improvements in the technology abound, "AI-augmented machine learning has dramatically increased the accuracy of both automatic speech recognition (ASR) and related

natural language processing (NLP)" (Alexander et al., 2019). As the NLP of chatbots increase, so will their implementation in education. This technology is already utilized on campuses of higher education: Georgia State's "Pounce" or Winston-Salem State University's "Winston" have both beneficially impacted the universities through an increase in student responses and student retention (Bendici, 2018).

Other studies illustrate the benefits of chatbot use in universities. In a flipped-classroom research study use of three types of chatbots used out of the classroom, Huang et al. (2019) found that graduate students perceived chatbots to be helpful in warding off feelings of isolation. Though the synchronous capacity of chatbots is useful with preventing isolation, the study also concludes students find it challenging to perceive a chatbot as a human being. Huang et al. did not specify whether this is a positive or negative aspect of student discernment.

Song and Oh (2019) found a positive association between learner achievement and chatbot use. In a study that examines student participation in online courses and synchronous interaction with a conversation agent, the quality of student-chatbot conversation indicates a significant correlation with student achievement.

Meanwhile, informal education use of chatbots is a rising trend. A structured review of the literature shows the current trend in the use and subsequent research of mobile pedagogical chatbots and the general use of pedagogical chatbots for informal education applications (Hobert & Meyer von Wolff, 2019).

Though chatbots can be utilized to circumvent isolation and increase student achievement, it is important to examine the forms of chatbots that might be successful in formal education. There are two forms of chatbots Cunningham et al. (2019) find especially suited for education. An FAQ Chatbot might reduce an instructor's workload through interactive responses

to learners' frequently asked questions while simultaneously addressing student needs, consequently reducing isolation and frustration. Another form is a quiz chatbot, which implements an interactive assessment prompting students for justification for their responses to multiple-choice questions. Along with addressing isolation, learners receive immediate feedback with the possibility of "tutoring" the student through misconceptions to final clarification (Cunningham et al., 2019).

Methodology

Research Design

The researcher is interested in the use of pedagogical chatbots in order to solve an issue with perceptions of isolation found inherent to online courses. Rather than have a set theory to disprove, this study is driven by the currently unknown perceptions of the chatbot use in the English Composition classroom. Using an emergent grounded theory model acknowledges the researchers' bias while allowing the data collected to drive the resulting theory. Open coding prevents limitations and affords the constant comparative method Glaser and Holton state is essential to emerging theoretical coverage and saturation (2004).

Of course, it is necessary to address the validity of a qualitative methodology with open-ended interview questions. The questions are structured, and while the interviewer is recoding the exchange, she will create memos, noting ideas about the interviews and the categories. This is an important process to grounded theory as it helps to shape the analysis of extensive data (Creswell & Guetterman, 2019; Glaser & Holton, 2004). Detailing and coding the information accessed through interviews and the chatbot transcripts help to develop the themes that are then applicable to other populations. According to Creswell, "the value of qualitative research lies in

the particular description and themes developed in a context of a specific site" (2018). This amount of detail affords the generalizability of the study.

Population and Sampling

The target population for this study includes one online English Composition (writing) course in University College, an urban university situated in the northeast of the United States. At the time of this scenario, the makeup of the class is unknown, and the average class size is 25. The sample is a purposeful, complete-target population selection that is dependent upon the course roster. The qualitative inquiry strategies employed will include naturalistic inquiry based upon actual chatbot usage, emergent design flexibility with the intent to remain flexible and responsive to subjects, and the qualitative analysis of the information-rich cases presented by the purposeful, complete-target population (Patton, 2014).

The interviews are optional and conducted until saturation is reached, which is essential to fully illustrating the range of perceptions (Strauss & Corbin, 1998). Because of this, this sample size cannot be predetermined but must be driven by saturation (Mason, 2010). The instructor will not know which students opted to participate in the interviews to avoid any preferential treatment. Consent forms will be required with parents/guardians signing for students under eighteen.

According to datausa.io's (n.d.) college profile, the 2017 acceptance rate is 91.9%, with a full enrollment of 8283 students, 67% of whom are full time. The 2017 data show that students enrolled at New Jersey City University in full-time undergraduate and graduate programs are broken down as follows: 36.4% Hispanic or Latino, 25.3% White, 21.4% Black or African American, 7.62% Asian, 1.77% two or more races, 0.483% Native Hawaiian or other Pacific Islanders, and 0.338% American Indian or Alaska Native. The majority of undergraduates are

Hispanic or Latino female (24.5%), Hispanic or Latino male (16.2%), Black or African American female (14.7%).

Instrument

There are two instruments for data collection. One instrument is the chatbot transcript, which will be downloaded at the end of the course. This transcript records the dialog between the user and the chatbot. The transcripts will be coded with ongoing memo taking and recording. The second instrument is a set of interview questions used to elicit open-ended responses from phone interviews. These questions will be pilot tested with five students. The pilot test is integral to the study as it establishes the validity of the questions and will be used to revise the instrument (Creswell, 2015). The instrument is located in the appendix.

Procedures

This study requires several steps.

- Spring 2021: Meet with Dr. Professor (instructor at University College) to obtain permission from Dr. Professor, an online English Composition instructor, to conduct the research in one of her virtual English Composition classrooms with a goal of Fall 2021 as the semester of implementation.
- Spring 2021 Compose sample consent forms (include in IRB packet) for the instructor, under-age students, and of-age students. This is required of the IRB process at NJCU. Samples are available through their department.
- Spring 2021 Compose data collection instruments (interview questions), paying special attention to wording and validity, which is essential to the credibility of the study (Creswell & Cresswell, 2017).

- Spring 2021 Pilot the instrument and incorporate revisions (include in IRB packet with sample chatbot transcript)
- Spring 2021 Compose and submit the IRB application as one packet to RB@njcu.edu and cc kresch@njcu.edu. Note: *review takes 4-6 weeks.*
- Upon IRB approval, coordinate with Dr. Professor to determine which courses are available for study.
- Spring 2021 Develop chatbot (snatchbot.me) with Dr. Professor, including frequently asked questions and guidelines for writing in her courses.
- Spring 2021: Test chatbot with five colleagues and students to ensure workability.
- Fall 2021: Implement chatbot use in course, troubleshooting issues that arise as needed.
- Fall 2021: Week four of the semester, schedule interviews. Take memos. Download chatbot transcript to coincide with the interview.
- Fall 2021: Week five of the semester, begin interviews. Take memos. Download chatbot transcript to coincide with the interview.
- Fall 2021: Week six of the semester, end interviews. Take memos. Download chatbot transcripts to coincide with the interview.
- Fall 2021: Weeks seven-sixteen of the semester, code interviews using open coding
- Fall 2021: Weeks ten and eleven, research emerging themes and amend the research to literature review
- Fall 2021: Weeks seven-sixteen of the semester, using open-coding, review and revisit the data to find emerging themes and analyze the data

References

dataues.io, n.d.. https://datausa.io/profile/university/new-jersey-city-university

Alexander, B., Ashford-Rowe, K., Barajas-Murphy, N., Dobbin, G., Knott, J., McCormack, M., Operant, J., Seilhamer, R., & Weber, N. (2019). *EDUCAUSE horizon report: 2019 Higher education edition*. Louisville, CO: EDUCAUSE.

Baker, C. (2010). The impact of instructor immediacy and presence for online student affective learning, cognition, and motivation. *Journal of Educators Online, 7*(1), 1-30. Retrieved from https://eric.ed.gov/?id=EJ904072

Bendici, R. (2018). Rise of the machines: Artificial intelligence--led by text-based chatbots--has infiltrated campus life, helping institutions improve communication, compliance and retention. *University Business*, 21(10), 53–55.

Berry, G. R. (2018). Learning from the learners: Student perception of the online classroom. *Quarterly Review of Distance Education, 19*(3), 39–56.

Bii, P. (2013). Chatbot technology: A possible means of unlocking student potential to learn how to learn. *Educational Research, 4*(2), 218-221.

Bourdeau, D. T., Griffith, K. V., Griffith, J. C., & Griffith, J. R. (2018). An Investigation of the relationship between grades and learning mode in an English Composition Course. *Journal of University Teaching and Learning Practice*.

Burgess, S., & Sievertsen, H. H. (2020). Schools, skills, and learning: The impact of COVID-19 on education. VoxEu.Org. https://voxeu.org/article/impact-covid-19-education

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Creswell, J. W., & Guetterman, T. C. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Pearson.

Croxton, R. A. (2014). The role of interactivity in student satisfaction and persistence in online learning. *Journal of Online Learning and Teaching, 10*(2), 314.

Cunningham-Nelson, S., Boles, W. W., Trouton, L., & Margerison, E. (2019). A review of Chatbots in education: Practical steps forward.

Forbes, M. R. (2019). Experiences of using intelligent virtual assistants by visually impaired *students in online higher education* (Publication No. 27542484) [Doctoral dissertation, University of South Florida]. ProQuest Dissertations & Theses Global.

Futch, L. S., deNoyelles, A., Thompson, K., & Howard, W. (2016). "Comfort" as a critical success factor in blended learning courses. *Online Learning, 20*(3), 140-158.

Georgescu, A. (2018). Chatbots for education - trends, benefits and challenges. *Elearning & Software For Education*, 2, 195-200. doi:10.12753/2066-026X-18-097

Glaser, B.G. & Holton, J. (2004). Remodeling grounded theory. *Forum: Qualitative Social Research, 5*(2)Article 4. Retrieved from http://www.qualitative-research.net/fqs-texte/2-04/2-04glaser-e.htm

Hobert, S., & Meyer von Wolff, R. (2019). Say Hello to Your New Automated Tutor–A Structured Literature Review on Pedagogical Conversational Agents. Retrieved from https://pdfs.semanticscholar.org/864c/9f96bd72e1a7c2add8fbf332193ddc78a843.pdf

Huang, W., Hew, K. F., & Gonda, D. E. (2019). Designing and evaluating three chatbot-enhanced activities for a flipped graduate course. *International Journal of Mechanical Engineering and Robotics Research, 8*(5).

Jarvie-Eggart, M., Freeman, T., & Kemppainen, A. (2019). Online programs increase the availability of education. *The ASEE Computers in Education (CoED) Journal, 10*(3).

Kelly, R. (2017). 11 Ed tech trends to watch in 2017. *Campus Technology Magazine, 30*(3), 20-28.

Li, L., Finley, J., Pitts, J., & Guo, R. (2011). Which is a better choice for student-faculty interaction: synchronous or asynchronous communication? *Journal of Technology Research*, 2, 1-12.

Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research*, 11(3). https://www.qualitative-research.net/index.php/fqs/article/view/1428/3027#g12

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.

Strauss, A. & Corbin, J. 1998. *Basics of Qualitative Research*. Thousand Oaks, CA: Sage Publications.

Song, D., Rice, M., & Oh, E. Y. (2019). Participation in online courses and interaction with a virtual agent. *International Review of Research in Open and Distributed Learning*, *20*(1), 43-62. https://doi.org/10.7202/1057971ar

Tichavsky, L. P., Hunt, A. N., Driscoll, A., & Jicha, K. (2015). "It's just nice having a real teacher": Student perceptions of online versus face-to-face instruction. *International Journal for the Scholarship of Teaching and Learning, 9*(2), 2. https://doi.org/10.20429/ijsotl.2015.090202

Wingo, N. P., Ivankova, N. V., & Moss, J. A. (2017) Faculty perceptions about teaching online: exploring the literature using the technology acceptance model as an organizing

framework. *Online Learning 21*(1), 15-35. https://draweb.njcu.edu:2074/10.24059/olj.v21i1.761

Winkler, R., Hobert, S., Salovaara, A., Söllner, M., & Leimeister, J. M. (2020). Sara, the lecturer: Improving learning in online education with a scaffolding-based conversational agent. Paper presented at the ACM CHI Conference on Human Factors in Computing Systems.

Appendix

Open-ended Interview Questions

Instructor:

1. Tell me about your experience using the chatbot?
2. In what ways did your interactions with the students differ from previous years?
3. In what ways was using the chatbot beneficial?
4. In what ways was using the chatnot not helpful?
5. What is your overall impression of the chatbot in this class?

Student:

1. Tell me about your experience using the chatbot?
2. Why would you use the chatbot?
3. In what ways was using the chatbot beneficial?
4. In what ways was using the chatnot not helpful?
5. What is your overall impression of the chatbot in this class?
6. How does the chatbot effect how you feel about the course?