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

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EDTC810: Statistics for Educational Research

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May 9, 2021

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Chapter One: Introduction

Introduction

This study seeks to explore student and instructor perceptions of pedagogical chatbot use in an online undergraduate English Composition course. With the COVID-19 pandemic of 2020, many institutions of higher education, 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 online learning 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 more course offerings or to 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

In online courses, 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 for more extended periods of time for feedback and responses than in face-to-face courses (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 use to inform whole-class instruction, 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 purpose of this study is to explore student and instructor perceptions of chatbot use in an online undergraduate English Composition course. This qualitative study will use open-ended interview questions and saved chat transcripts to collect data. Moreover, this study will

follow an emergent, grounded theory design as espoused by Glaser to so as to identify emerging categories and generate substantive theory (2017).

Research Questions

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 use chatbots in their online English composition course?
3. What is the instructor's perception of the use of chatbots in online English composition courses?

Limitations

This study is limited by an absence of previous research that addresses the specific topic in a substantive manner. Additionally, data could only be collected remotely through phone interviews and email because of the nature of the student schedules. Another limitation is the biases of the participants and the researcher frame responses and questions. Finally, the chatbot used is a more basic chatbot, used to answer frequently asked writing and formatting questions and will have its own limitations.

Delimitations

A delimitation is that the study only considers the students in one online undergraduate course in an urban state university in New Jersey. Their experiences may not extend to students in other states or regions. The number of students in the course is 20, and that might also be a delimiting factor since results could vary with greater or fewer numbers of participants.

Assumptions

The researcher assumes the participants will be honest and forthcoming in

their responses to the interview questions. Another assumption is the participants in the online course will have sufficient experience with technology to use chatbots. Additionally, the researcher assumes she will find core theoretical concepts in the data to link and develop. The assumption is that this emergent, grounded theory analysis will produce "a substantive, conceptual theory with general implications" (Glaser, 2001). Finally, the researcher assumes the participants are willing to engage in the study.

Chapter Two: Literature Review

Introduction

In emergent grounded theory, creating a literature review prior to the study might add some constraints which could hinder the realization of emergent theory (Dunne, 2011). However, for this proposal it important to understand the context of the limited research surrounding pedagogical conversation agents (chatbots). Some research indicate mixed success with pedagogical chatbot use in language learning classrooms (Bii, 2013). However, the literature is scant on practical pedagogical use in general studies, undergraduate courses. A review of the research literature indicates a need for scholarship in classroom AI, including chatbot utilization (Zawacki-Richter, 2019). Important information presented in this literature review reveal that students lose motivation when feeling confused or isolated. And while a chatbot cannot replace an instructor, the perceived benefits of a pedagogical chatbot merits further study. This is particularly relevant if it mitigates challenges undergraduates and their instructors face in online learning.

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 absence in interactivity. Research concludes that in online courses, especially between student–instructor, interactivity is 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 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 are a rising trend. A structured review of the literature shows the current trend in the use and subsequent research of mobile pedagogical chatbots and a 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).

Summary

The reduced pace of communication in asynchronous distance learning proves frustrating for some college students. Online learning, though necessary for some and convenient for others, is de-motivating and isolating. As enrollment in online programs continues to increase, the achievement of enrolled learners is vital to the success of institutions of higher learning. Pedagogical chatbots may be successful tools to alleviate negative experiences and associations with asynchronous learning. While there is a void in research studies pertaining to practical pedagogical uses of conversation agents in education, the immediate and responsive nature of chatbots seems to address issues of where there is isolation, confusion, and a consequent loss of motivation.

This literature review highlights one of numerous objectives. The context presented in the above review can be used to extrapolate pedagogical chatbot use in an undergraduate English composition classroom will benefit learners and instructors. First-year composition courses are

challenging to start and necessitate a large expenditure of energy from instructors who must often offer feedback and guidance for each assignment. An absence of immediate feedback and the conversational shortcuts intrinsic in asynchronous learning necessitate even more outlay from instructors.

Chapter Three: Methodology

Introduction

The intention of this study is to explore the perceptions of students and the 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 chatbot transcripts and through in-depth telephone or Zoom interviews using the open-ended interview questions listed in the appendix.

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 use chatbots in their online English composition course?
3. What is the instructor's perception of the use of chatbots in online English composition courses?

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 the in English Composition classroom. Using an emergent grounded theory model acknowledges the researchers bias while allowing the data collected drive the resulting theory. Open coding prevents limitations and affords the constant comparative method Glaser states is essential to emerging of theoretical coverage and saturation (Glaser, 2004).

Of course, it is necessary to address validity of a qualitative methodology with open-ended interview questions. The questions are semi-structured and while the interviewer is

recording the exchange, she will create memos, noting ideas about the interviews and the categories. The use of in-depth interviews using open-ended questions allows for the participants to fully voice their experiences. The interviewer will note any follow up questions used to elicit further explanation. This is an important process to grounded theory as it helps to shape the analysis of extensive date (Creswell & Guetterman, 2019; Glaser, 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 Sample

The target population for this study includes one online English Composition (writing) course in New Jersey City University, an urban university situated in the northeast of the United States. At the time of this proposal, 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, 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 throughout the course. This transcript records the dialog between the user and the chatbot. The transcripts will be coded with ongoing memo taking and re-coding. The second instrument is a set of in-depth interview questions used to elicit open-ended responses from phone or Zoom interviews. These questions will be pilot tested with 5 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, 2018). The questions are located in the appendix.

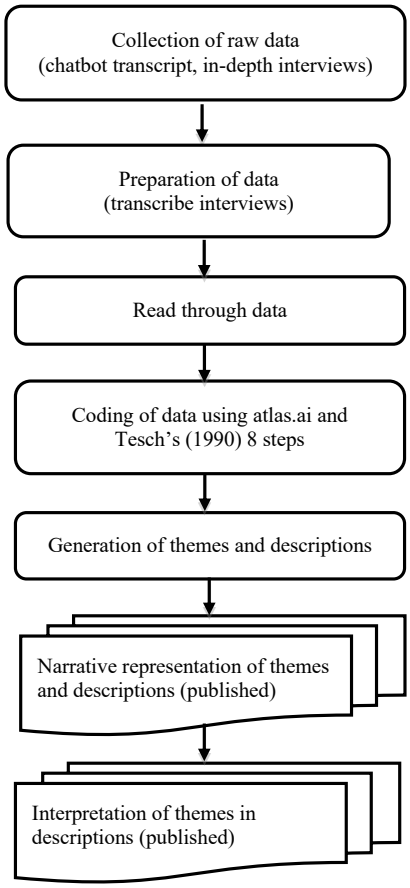
Data Analysis

Grounded theory requires an active and reflexive process for data analysis (Patton, 2014). This study intends to code and analyze the chatbot transcript data iteratively, using data from the in-depth interviews and transcripts to develop inductive categories to construct theory (Charmaz, 2011). The coding will be conducted using the software atlas.ti and triangulated by two

additional experts. In-depth interviews will continue until saturation is reached or the participant list has been exhausted. Finally, the entire process of analysis will be carefully documented and included in the final report. Patton (2014) writes, "analysts have an obligation to monitor and report their own analytical procedures and processes as fully and truthfully as possible (p. 531). This is essential to the validity of the qualitative process and the ultimate findings. Creswell and Creswell (2018) recommend that researchers view qualitative research procedurally, including multiple levels of analysis throughout the specific process. Figure 1 visually details the analysis process for this study.

Figure 1.

Data Analysis Procedural Flowchart



Procedures

This study requires several steps.

- Spring 2021: Obtain permission from the professor, online English Composition instructor, to conduct the research in one of her virtual English compositions classrooms with a goal of Fall 2022 as semester of implementation.
- Summer 2021 Compose sample consent forms (include in IRB packet) for instructor, under-age students and of-age students. This is required of the IRB process at NJCU. Samples are available through their department.
- Summer 2021 Compose data collection instruments (in-depth interview questions) paying special attention to wording and validity, which is essential to the credibility of the study (Creswell & Cresswell, 2017).
- Summer 2021 Pilot the instrument and incorporate revisions (include in IRB packet with sample chatbot transcript)
- Summer 2021 2020 Compose and submit 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 the professor to determine which courses are available for study.
- Summer 2021 Develop chatbot (snatchbot.me) with the professor, including frequently asked questions and guidelines for writing in her courses.
- Fall 2021: Test chatbot with five colleagues and students to ensure workability.
- Fall 2021: Implement chatbot use in course, troubleshooting issues which arise as needed.

- Fall 2021: Week four of semester, schedule interviews. Take memos. Download chatbot transcript to coincide with interview. Code and analyze data looking for emergent themes.
- Fall 2021: Week five of semester, begin interviews. Take memos. Download chatbot transcript to coincide with interview. Code and analyze data looking for emergent themes.
- Fall 2021: Weeks six through eight of semester, end interviews. Take memos. Download chatbot transcript to coincide with interview. Code and analyze data looking for emergent themes.
- Fall 2021: Weeks nine through eleven, research emerging themes and amend the research to literature review.
- Spring 2022: Review and revisit the data to find emerging themes and analyze the data. Format the data into narrative and visual representations.

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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?