Assignment 1: Methods Literature Review

Susan Suarez

Educational Technology Leadership, New Jersey City University

EDTC 810 Statistics for Educational Research

Dr. Mark Connolly

February 7, 2021

Assignment 1: Methods Literature Review

Bii et al. (2019) sought to measure the teachers' attitude in developing countries towards the use of chatbot technology for pedagogical purposes. The researchers employed mixed methods, repeated treatment quasi-experimental case study. Two randomly selected schools installed chatbots into their computer laboratories. Ten of the teachers teaching computer science were trained in using the chatbot for teaching. Those teachers taught the students to use the chatbots for pedagogical activities for 20 weeks over two terms. The schools randomly chosen were from Kericho County, Rift Valley Province of the Republic of Kenya. All of the schools were pooled and those who offered computer science as an examinable subject served as the pool. The Form Two level class was a purposeful selection as that level would utilize the chatbot.

The attitude towards chatbot use in teaching was measured through a 5-point Likert Scale questionnaire containing twenty items. The overall mean for all teacher attitude measurement items was determined from the tallied responses. To determine majority teacher views per item and to note outliers, analysis of individual teacher responses to each question was also implemented. Finally, "teacher responses to the last open-ended item seeking chatbot improvement suggestions from them were analyzed, categorized, frequency tallied and sorted in descending order to indicate overall priority for solution" (p. 1590).

Huang et al. (2019) do not explicitly state their methodology, but the procedure is also quasi-experimental and qualitative, though single-case. The research set out to provide insights about students' attitudes toward three types of chatbot activities and students' chatbot interactions. The researchers designed three chatbot activities, quiz, informational, and bibliographic tutor. All chatbot activities were used as pre-class activities. For an average of 20 minutes, students interacted with the three chatbots via the course website. After the interaction,

the participants completed a questionnaire and a interview to determine their chatbot perceptions. Fourteen graduate participants were invited to participate and thirteen of them did log into the course. Ten completed the activities, and eight participants completed the questionnaires and agreed to the interview. In questionnaires using ten-point Likert scales from not at all (1) to absolutely (10), social presence was measured with six items and interpersonal attraction with four items. The research team asked the participant a set of semi-structured interview questions.

Also a single case study, the Song et al. (2019) research study utilized a quantitative research design. The researchers used implemented correlation and factor analyses of interaction with a conversational agent (chatbot), learners' participation in an LMS, and learner performance. This study's data were collected from online courses at a mid-sized university located in the southern United States. Fifty-six participants were recruited from four graduate courses in an educational technology program. The courses were 15 weeks long, with an introduction module in the first week, a review, and final paper submission the final week. To examine learner participation, the researchers "collected data on seven variables: System Access, Time Spent, Discussion Length, Discussion Quality, Conversation Length, Conversation Quality, and Final Grade" (p. 49). An instructor and a research assistant from the participating courses separately coded participants' discussion board postings and conversations with the agent. The researchers first calculated means and standard deviations of the seven variables listed above to analyze the data. Participation data from the LMS and the learner interaction data from the agent system were analyzed using parametric correlation analysis. Participation and interaction factors underlying participants' behavior were determined using a Principal Components Analysis.

While Song et al. used a quantitative approach to measure participation, Wingo et al. (2017) employed quantitative methods to understand research about faculty perceptions of the ease of use of technology. Wingo et al. applied a validated model for technology acceptance (TAM2) as a framework to survey research literature about factors that influence faculty's adoption of online courses and their willingness to teach online. The researchers synthesized 67 empirical studies about faculty teaching online published between 1995 and 2015 and found through purposeful search processes with at least one construct in the TAM2 model.

The researchers first used a search for studies that used the TAM or TAM2 in a variety disciplines to acquire an understanding of the applications of these models. They then narrowed the search studies that used either of the models as theoretical frameworks for the experience of online teaching. The search was further adjusted to explore research that addressed technology acceptance and adoption outlined in the TAM2 model in terms of teaching online. To analyze these articles, Wingo et al. made a list of construct components from the TAM2 model then while reading each article, made notes about the reported findings that reflected the TAM2 construct components. The researchers grouped the TAM2 construct components and developed summaries of the major results.

Bourdeau et al. (2018) also use a validated methodology as a framework, employing "an ex post facto, causal-comparative research model to examine 2,919 student grades (aggregate data) for a 2015-16 academic year tertiary English composition course" (p. 5). They aimed to examine four different learning modes: traditional classroom lecture, online learning, EagleVision Home, and EagleVision Classroom to determine any differences in grade distribution, pass rates, and withdrawal rates.

The researchers used chi square (n=2,859) to examine failure rates and grade distributions for all students who did not withdraw from ENGL 123. A Type I error rate of .05 (alpha) was used for testing. To avoid Type I errors, the Bonferroni adjustment was applied when dealing with multiple pairwise tests. Withdrawal data were examined using all 2,919 records, using chi square and Fisher's Exact Test, which was only used when "chi-square results yielded low cell count" (p. 6).

References

Bii, P. K., J. K. Too, and C. W. Mukwa. “Teacher attitude towards use of chatbots in routine teaching.” *Universal Journal of Educational Research* 6.7 (2018): 1586-1597.

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*.

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).

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

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.