Assignment 2: Analysis of the Data/Findings Review

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Bii et al. (2019) intended to measure teachers' attitude in developing countries towards the use of chatbot technology for pedagogical purposes. This this end, 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 data regarding teachers' attitude towards chatbot technology use in their teaching and suggestions on technology improvement was collected through a questionnaire with relevant attitude-eliciting questions.

The attitude towards chatbot use in teaching was measured through a 5-point Likert Scale questionnaire comprised of 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).

The findings from the study are presented in the article in bar graphs for each individual question and a score summary with minimum, maximum, mean, and standard deviation (SD) for each Likert Scale question. The average mean attitude rating score was 3.572 indicating to the researchers a overall positive rating for chatbot use by the teachers. The qualitative portion, an opened- endede questions soliciting suggestions for improvement show that the participants feel chatbots should come preprogrammed with question and answers to save time and avoid incorrect answers by students and that chatbots need internet search capabilities.

Huang et al. (2019) do not explicitly state their methodology, but the procedure is also quasi-experimental and qualitative, though the study is single-case. The researchers sought 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 an 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 participants a set of semi-structured interview questions. The Likert questions were: "Can you tell me about your feeling of learning with chatbot?." "Which kinds of chatbot (MCQ chatbot, Case Study chatbot, and Dictionary chatbot) do you prefer? And why?," and "Could you give any comments or suggestions about chatbot implementation in out-of-class flipped course component?". The responses are presented in a table of descriptive statistics including mean and SD showing a SD of anywhere between 1.93 and 2.93 on a ten-point scale. This information shows the participants' neutral and positive attitudes towards the chatbot. However, learners' willingness to spend additional time with chatbots is slightly negative.

Also a single case study, Song et al. (2019) employed a quantitative research design. The researchers 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 southern United States, mid-sized university. 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 each coded participants' discussion board postings and conversations with the agent separately. 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.

Perhaps because this was a quantitative study, in very clear terms, the researchers state among the participating online courses they found no statistically significant difference of all seven variables "(Final Grade: $F(3, 52) = .79$, $p = .51$; System Access: $F(3, 52) = 1.38$, $p = .23$; Time Spent: $F(3, 52) = .56$, $p = .64$; Discussion Length: $F(3, 52) = 1.00$, $p = .40$; Discussion Quality: $F(3, 52) = 1.16$, $p = .34$; Conversation Length: $F(3, 52) = 1.97$, $p = .13$; Conversation Quality: $F(3, 52) = .37$, $p = .78$)" (Song et al., 2019, p. 50) and conjecture it is due to a small sample size. The researchers concluded that "the frequency and length of course access, the quantity and quality of asynchronous discussion, and the quality of synchronous conversation with a virtual agent were significantly associated with the learner achievement" (Song et al., 2019, p. 54).

While Song et al. employed 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 across several disciplines to obtain an understanding of the applications of these models. Then, they 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. created 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. The results were presented in tables sorted by construct, works cited, and major findings that include 67 empirical studies about faculty teaching online with publications ranging from 1995 - 2015.

Finally, 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). The researchers 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).

Bourdeau et al. (2018) presented the data in 9 tables: Table 1. English composition course pass and failure rates based on learning modes (n=2,859); Table 2. Pass/failure rate comparison: chi-square contingency table results (α=.05); Table 3. Chi-square post-hoc results: failure rate (α=.05); Table 4. Grade distribution by modality (n=2859); Table 5. Relationship of grades to learning mode: chi-square contingency table results (α=.05); Table 6. Chi square post-hoc results: grade distribution (α=.05); Table 7. Student withdrawals by modality (n=2,919); Table 8. Withdrawal rate chi-square test results (α=.05); and Table 9. Fisher's exact test post-hoc results: withdrawal rates (α=.05).

The results of the study indicate that grade distributions demonstrate a correlation to learning modes. Traditional "In-Person" student performance demonstrated a significant difference from all the other modes, earning the second highest percentage of As and the highest number of Bs and earning fewer Cs, Ds and Fs. Online students earned more As and fewer Bs, Cs, Ds and Fs than did the EagleVision Home students.

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