

FINAL EXAMINATION

RESEARCH ARTICLE EVALUATION

Whitmire, E. (2002). Disciplinary differences and undergraduates' information-seeking behavior. *Journal of the American Society for Information Science and Technology*, 53(8), 631–638.

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FRAMEWORK FOR ARTICLE

PROBLEM STATEMENT

Whitmire (2002) does not state any problem outright, diving into her discussion of information-seeking behavior without first explaining why. She alludes to the problem toward the end of the Introduction by stating, "The focus of the prior studies was on disciplinary differences in the information-seeking behavior of faculty and graduate students while the present study focuses on disciplinary differences in the information-seeking behavior of undergraduate students," (p. 631). She further confirms this at the end of the Background section, in the last sentence, stating: "The main research question is: are differences in undergraduates' information-seeking behavior based upon their academic discipline along Biglan's dimensions?" (p. 632, citing two of Biglan's studies from 1973).

While academic disciplines are fairly easy to categorize, particularly since Whitmire (2002) is using a model of categorization from a previous author, she is less clear about what information-seeking behaviors she would expect to see from students in various disciplines.

DEFINITIONS

While it takes the author a while to state the problem she is studying, she does give a good explanation of Biglan's model of disciplinary differences in the Background section (pp. 631-632). Whitmire (2002) explains how the data on disciplines for the students is gathered and categorized in later sections of the article.

Whitmire (2002) gives less analysis of what "information-seeking behavior" is – it seems as though the author assumes the reader knows what such behavior should and should not look like. But she does define how information-seeking behavior is self-reported in the Method section of the article (p. 633).

LITERATURE REVIEW, HISTORICAL BASIS AND REVIEW FINDINGS

The literature review is given in the Background section of Whitmire's (2002) article (pp. 631-632), with primary emphasis on Biglan's article on the classification of disciplines published in two articles in 1973. Most of the articles cited are from the previous millennium, although given the publishing date of 2002, that does not necessarily mean they are out of date. Two were published in 2000 and 2001 (Smart, Peldman & Ethington; Pike & Killian); another four were published throughout the 1990s. The remaining citations are far older, with one from 1986, three from 1981 and 1982, and one going back to 1978.

That said, this collection of articles shows a familiarity with the progression of research related to Biglan's model over time. But it also shows her emphasis on who is doing the research vs. *how* they are doing it – research methods have changed a great deal between the 1970s and the time of this publication, while the scholarly departments have not. And the articles chosen for review reflect that categorization, looking at how the area of study can affect communication skills, learning styles, and productivity; Whitmore posits that this is the first article to apply Biglan's model to the field of library science (p. 682).

However, there are no articles analyzed about the history of information-seeking behavior in the literature review. It is not until the Discussion section toward the end of the article that Whitmore (2002) considers other studies about how students in various disciplines search for information without a discussion of Biglan's model (p. 636).

Whitmire (2002) doesn't seem to have any conflicts of interest as regards to funding. She works at the University of Wisconsin-Madison, and the only people thanked at the end of the article are colleagues that helped with reviewing the article and giving her feedback.

The author uses Biglan's model as the foundation for this study. She presents a compelling argument for the application of his categorizations as they have been applied in other studies. While it makes sense that students of different academic disciplines may search in different ways, Whitmire (2002) gives no reasoning behind this leap in logic, nor does she present any articles that argue against Biglan's model in order to acknowledge a different perspective.

The text of the literature is relatively short, only three paragraphs. All citations are paraphrased without any direct quotations of reasoning or conclusions. Whitmire (2002) box scores all of the articles cited, categorizing the results of the studies without any further explanation. For example, this run-on sentence groups together most of the articles in the review with little to no further mention in the article, with the exception of Biglan:

Researchers used Biglan's typology in education research to investigate disciplinary differences in several areas in higher education including: faculty productivity and commitment to research, teaching, and service (Biglan, 1973b), undergraduates' critical thinking and communication skills (Li, Long, & Simpson, 1999), undergraduate learning (Pike & Killian, 2001), teaching and learning (Hativa & Marincovich, 1995), faculty salary allocations (Smart & McLaughlin, 1978), learning styles (Kolb, 1981), characteristics of graduate students (Malaney, 1986), and faculty productivity and socialization (Creswell & Bean, 1981). (p. 632)

PARAMETERS FOR THE STUDY

VARIABLES

Whitmire (2002) clearly states her variables for this study on p. 632: "The variables in this study focused on three areas from the CSEQ: (1) background characteristics, (2) academic discipline/major, and (3) information-seeking behavior."

The author does not define a dependent variable, but she is clearly trying to examine a dependent variable of information-seeking behavior – the study is trying to determine whether a person's academic discipline affects how they search for information.

This leaves two independent variables that are studied to see if they explain information-seeking behavior: background characteristics and a person's area of study. But what are background characteristics? They are not mentioned in her hypothesis, and her note of them in the variables is her first inclusion of the idea in her study of information-seeking behavior.

Whitmire (2002) does give an explanation of what she uses as "background characteristics" in the following section, giving readers a table showing how many students in the study are male or female, white or students of color, and categorizing participants by year of study (1st, 2nd, 3rd, and 4th). While this can be helpful information, if her goal is to study how academic discipline affects information-seeking behavior, she has not explained how year of study, or especially gender or race/ethnicity, would be a factor in that research.

HYPOTHESIS

Whitmire (2002) states a hypothesis in the final paragraph of her Background section: "The hypothesis is that differences in the various dimensions of the academic disciplines produce differences in information-seeking behavior," (p. 632). She does not state a null hypothesis in the article, but one can infer from the above statement and the problem statement that follows in the paper that the null hypothesis would be, "There are no differences in information-seeking behavior that can be correlated to the academic discipline of the student along Biglan's dimensions."

POPULATION

Whitmire (2002) does not label her population as such, but she does specify that she wants to study the information-seeking behavior of undergraduate students. She further identifies that these students are at 4-year schools that can be defined as "research and doctoral universities, comprehensive colleges and universities, and liberal arts colleges," (p. 632).

The author gathers her data from a survey that was distributed through Indiana University to measure several college activities, including information-seeking behavior (p. 632). This seems to be a classic case of an opportunistic population, as it has been determined by those students who completed the survey. It also looks like Whitmire (2002) did not define her population and then collect her information, but she chose her data source that then determined the population.

SAMPLE

The sample in this study does not appear to be randomized either, as Whitmire (2002) only chooses students whose areas of study can be categorized within Biglan's model. This cuts her data sample nearly in half, from 10,000 students to 5,175. This makes me wonder how those students excluded from this research can be analyzed as compared to the ones that the author has selected as fitting her criteria.

It is difficult to know if this is a sample that is an appropriate size to reflect the population at large as there is no enrollment number included that would indicate how many students in total were enrolled at the 38 institutions from which the data was gathered in 1996.

THE STUDY

DATA GATHERING

As mentioned above, the data comes from a questionnaire circulated on campuses several years before Whitmire (2002) did this study. She explains,

Data for this study were obtained from the 1996 College Student Experiences Questionnaire (CSEQ) collected through Indiana University's Center for Postsecondary Research & Planning. The CSEQ measures the quality of students' college experiences among other measures. Specifically, one aspect of the CSEQ is measuring the time and effort that students expend engaging in college activities. The focus of this research is one particular college activity, namely information-seeking behavior. (p. 632)

While this means the study can be replicated, should it? The focus on the survey was broad and not focused on research behaviors, making it a questionable source for this study.

INSTRUMENTATION

There is no way to know what the environment was like when the data was collected, and information-seeking behavior is only one component of what sounds like a rather long survey. In addition, the full text of the 1996 study is not included, only the questions that pertain to Whitmire's (2002) research, so it is difficult to know where these questions fell in the questionnaire and how much attention might have been paid to their answers due to fatigue from completing a multi-page survey.

We also do not know whether there were any rewards for completion of the survey, or requirements to complete by professors, which could have affected motivation and therefore the reliability of the data collected. Finally, there is no mention of the author's consideration of the reliability of this study, and while the author determines that the "Biglan model provides a valid framework for examining differences in undergraduates' information-seeking behavior and implications for the provision of academic library services," (p. 637), the article is not convincing that the study is valid as there are no measures to compare her results to in order to confirm the validity.

METHOD

Whitmire (2002) takes the data from the 1996 survey as filtered for subject areas as described in the Sample section above. She then classifies this data into disciplines based on Biglan's model:

- Hard disciplines = physical sciences and engineering
- Soft disciplines = humanities, business, social sciences, and education
- Pure disciplines = physical sciences, humanities, and social sciences
- Applied disciplines = engineering, business, and education
- Life disciplines = social sciences and education
- Nonlife disciplines = physical sciences, engineering, humanities, and business (p. 633)

She also explains how some subject areas are categorized (accounting would be a business major, or English and philosophy fall under humanities), and that biology is excluded as it does not fall under any category in Biglan's model. While her textual explanation here is helpful, given the centrality of this categorization to the study, it would have been helpful to at least have an appendix that included all of

the majors of students in the study and how they were categorized, along with what majors had been excluded as they did not fit easily into Biglan's model. It also takes some reading to determine that there are three dimensions that include each of the categories, so that each category appears three times: as either Hard or Soft, Pure or Applied, and Life or Nonlife.

Whitmire (2002) gives us the ten questions from the survey about information-seeking, and she notes that each question is answered on a range from never to very often (p. 633). This is later shown to be a Likert-like scale of 1 to 4, with 1 representing "never" and 4 representing "very often," allowing for the calculation of means and standard deviation that can be used to compare the different groups and determine whether there is a statistical difference between them, using "independent samples Mests" to confirm or rule out a significant difference in each of the dimensions between the two categories (p. 633).

WHAT IS THE TAKE-AWAY?

RESULTS

Whitmire's (2002) analysis compares the means of the answers to the questions in three tables based on the dimensions: Hard vs. Soft, Pure vs. Applied, and Life vs. Nonlife. The tables would make more sense if the mean tables were labeled by type of discipline; one has to infer from the order of the labels below the chart what column represents which data, or to read the textual analysis to understand which categories of students were more likely to use library sources. (The same complaint can be aimed at the bar graphs comparing means, which also lack legends telling readers which color represents students in the Hard or Soft disciplines, for example.)

The statistical differences look small, but Whitmire (2002) does give us the p values for her calculations, and she notes when the p value is less than 0.001, or closer to 0.005, both of which are still convincing values; these calculations give at least 95% certainty in the results. And the differences do seem consistent across the dimension when looking at the bar graphs. For example, when reviewing the data for the Pure vs. Applied disciplines, all of the means for the Pure group are either equal to or more than the means for the Applied disciplines, so it does look like the Pure group is more likely to use library resources when looking for information (p. 635). However, the differences in the other two dimensions are not as distinct; Whitmire notes that the data only has statistically significant differences for 7 of the 10 activities when looking at the Hard vs. Soft dimension and 6 of the 10 when looking at the Life vs. Nonlife dimension, as compared to 9 out of 10 for the pure vs. applied statistics (pp. 634-635). And all of the discussion does focus on the hypothesis set out at the beginning of the article, that "differences in the various dimensions of the academic disciplines produce differences in information seeking behavior," (p. 632).

That said, the article leaves unanswered questions about the Mests comparison that Whitmire (2002) ran. There is no explanation of how she ran the tests or whether she tested for internal consistency to confirm validity. And the first paragraph in her analysis leaves me wondering if there is a typo, an omission of "Mests" or a new analysis known as "?" of which we are unaware, as it notes, "There were a total of three ?-tests conducted for each Biglan dimension," (p. 634).

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

The content of the Discussion section would be more convincing if the same studies from the Background (literature review) were analyzed here in conjunction with the results of the study. But Whitmire (2002) chose to look at reasoning behind Biglan's model at the beginning of the article, and only looks at the quality of information-seeking in the Discussion section. It's disappointing as it would be helpful to know more about the articles box scored in this section.

It is also interesting that the background information cited at the beginning of the paper, like year of study, is talked about in the Discussion section without any analysis that shows the differences in scores between, say, first-year students and fourth-year students. So the author's discussion is positing separate theories that were not studied here:

...the majority (32%) of the students in the sample were first-year students who had probably not enrolled in advanced courses in their major, and were still unfamiliar with the research literature and the academic library resources such as indexes and abstracts in their field of study. No recommendations are made or suggested in this paper. (p. 636)

It is heartening to see that Whitmire (2002) does acknowledge the limitations of her data, and that it would be good to learn more about what students are doing from off-campus, like searching databases remotely. Unfortunately, she does not acknowledge that it would be better to do a survey that is entirely focused on information-seeking behavior rather than extracting the data from a lengthy, comprehensive survey.

FINAL JUDGEMENT ANALYSIS

While the conclusion that a student's area of study can affect their information-seeking habits makes sense, this article alone would not be a reliable base of research for building an argument for separate approaches to teaching students in different disciplines. Further research would be needed to measure the information-seeking behaviors of such students, particularly one that would analyze the habits of students by their year of study, as students with several years of experience on campus would be more likely to be familiar with resources in their field of study, and may be more likely to use library resources. Whitmire (2002) does point this out but does not support it with her data analysis – the unspoken comment on the data is that 68% of the participants were *not* first-year students, and the author missed an opportunity to compare students' use of resources by both year of study and area of study.