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# COMBATING A ZOMBIE APOCALYPSE THROUGH SUBJECT-SPECIFIC RESEARCH:
## A TOPIC SELECTION PRACTICE

### ALICIA SALAZ AND TERESA MACGREGOR

## INTRODUCTION

What if you knew that in the same year a university began distributing iPads to all its incoming freshmen, students suddenly demonstrated better research skills?  What if you knew that this happened the same semester that students received guest lectures from the local public library and the IT department?  What if you were told that this coincided with the departure of one teaching librarian and the joining of another?  In this milieu, the research course at our institution experienced just this kind of unanticipated rise in year-over-year student research performance between the Fall semesters of 2012 and 2013.  While all of these statements about iPads, interdepartmental collaboration, and faculty changes were true, we are confident that none of them explain the improvement.  Rather, we concluded that the most likely explanation is a difference in the way that research topics were assigned to students in each year.  How we arrived at this conclusion, along with its implications for future practice, follows.

## LITERATURE REVIEW

The impact of topic selection on learning, interest, and motivation in undergraduate research is frequently addressed in professional practice, but not extensively explored in formal academic library research.  Though some scholarly or peer-reviewed conclusions about the impact of topic selection on learning outcomes can be found across academic library literature (e.g., Milner-Bolotin, 2001), most practitioners are probably more familiar with the body of practical guidance which emphasizes the importance of topic development to the research process.  In the context of research assignment design, the majority of knowledge about topic selection appears to come in the form of best practices from professional communication networks, rather than scholarly research.  The first standard of the Association of College and Research Libraries' *Information Literacy Competency Standards for Higher Education* (2000) is devoted to identifying, exploring, and developing a topic in response to an information need.  A web search for educational material on topic development yields thousands of results from libraries and writing centers around the world.  These sources elucidate in similar terms many of the problems with student research that can arise from a poorly chosen or developed topic.  Examples include the Massachusetts Institute of Technology Libraries, which tells students, "if your topic is too broad, you will find too much information and not be able to focus" (Select a Topic section, 2014).  Colorado State University's Writing Studio warns, "The topics we choose are often directly related to our research processes and their results…" (Research Considerations section, 2014, p. 22).  Grand Valley State University Libraries explain to faculty members how "an assignment that dictates too rigidly how students do their research can…breed frustration and disengagement" (Is It Possible…section, 2014).  These practitioner communications illustrate wide agreement that topic has some influence on the student research process and outcomes.  Similar conclusions can be found in the literature from related higher education disciplines.  John Bean, a leading

figure in the area of writing and critical thinking in higher education, argues that free topic choice undermines success for novice students:

> ...for many college writers…freedom is debilitating.  Not yet at home with academic writing or with the discourse conventions of a new discipline, these students are apt to produce 'all about' papers rather than arguments or quasi-plagiarized data dumps with long, pointless quotations and thinly disguised paraphrases. (2011, p. 75)

Likewise, Dennis Isbell (2008) argues that poor topic development results in substandard, unfocused and unoriginal research papers.

Given the extent of our knowledge about what works poorly, it is perhaps surprising how little we know about what works well.  Many different approaches to undergraduate research can be found used in practice.  In an examination of 191 assignment documents from 28 U.S. colleges and universities, Head and Eisenberg (2010) identified three predominant modes of topic assignment: These include having students choose their own topic from within a broad subject area (54%); asking students to select from a list of pre-approved topics (31%); and posing a single, uniform question for all students to address (15%) (p.8).  Many variations on these practices exist which might render them more or less effective.  For example, problem-based writing is a well-established approach to writing education which involves asking students to research and write on a real or hypothetical problem (Bean, 2011).  In the library field, an example of this is Stahura's and Milanese's (2013) use of the popular zombie apocalypse scenario as a research problem prompt.  The use of problem-based approaches could be used to augment any of the above-listed assignment types, and many other forms of variation exist.  The range of available practices invites a question about whether any one method is more likely to result in positive research outcomes.  This background caused us to consider the method of topic assignment as a possible explanation for our improved student research outcomes.

## METHODS

Our inquiry was conducted in the ex post facto research tradition (Morrison, Manion & Cohen, 2007).  This form of research is retrospective in nature, and centers on investigating the cause of an outcome by working backwards from a phenomenon to find plausible explanations for it.  The primary procedure is to identify factors that are always present when an outcome occurs, as well as factors which are always present when an outcome does not occur, and to interpret and analyze the findings.  It is often appropriate in situations common to social and educational settings where the selection, control, and manipulation of variables, as in traditional experimental research, is logistically or ethically challenging, or when researchers have no expectation that a significant outcome might occur, and thus have no reason to formally observe processes.  In our case, all of these factors hold true—we did not expect to see any surprising outcomes from our course year over year and would not have been able to organize an experimental approach regardless, mainly due to ethical concerns with classroom-based research.  Although the lack of control and manipulation involved with ex post facto research makes inferences from it tentative, it is productive for generating hypotheses for further investigation.  It allows us to determine whether an explanation is *probable* or *not probable.* To approach the truth about *why* something is, through probability, lays the foundations for becoming increasingly confident about that truth through further inquiry, and for informing our future practice as educators.  A brief description of our procedures follows.

All freshman students at our institution participated in a mandatory, for-credit research skills course in the Fall 2012 and Fall 2013 semesters.  After observing that student performance on the final paper appeared to be significantly better in the 2013 year group than in the 2012, the faculty members who taught the course began an ex post facto analysis to quantify the improvement, as well as to infer analytically what would likely have been the cause.  Topics and citations were gathered from 164 freshman research papers produced for both year groups—53 from 2012 and 111 from 2013—to facilitate a data-based comparison of the year groups.  A list of possible explanatory hypotheses was generated and analyzed based on the data collected from the student work samples as well as student feedback and faculty member recollection and reflection.

A list of plausible explanations for what we observed can be generated by asking what course-related variables changed between 2012 and 2013.  In terms of research methodology, this would identify factors that were present when the outcome (good papers) occurred in 2013, but were absent when the outcome (good papers) did not occur in 2012.  Between the two academic years, several changes to the course were made, either deliberately or by

circumstance. We have written these changes as hypotheses and sorted them into five major categories of educational intervention which are known to affect the classroom experience and learning: curriculum, pedagogy, students, teachers, and technology.

**Curriculum**:
The Fall 2013 class experienced two new curriculum units dedicated to information technology literacy, as well as one unit dedicated to resources from the nearby public library.

**Pedagogy**:
The students in 2012 were assigned a free and open choice of topic on the course's final paper, while the students in 2013 were assigned to choose a discipline-specific topic in response to a hypothetical problem scenario.

**Students**:
The 2012 and 2013 classes were entirely different sets of individuals with unique backgrounds.

**Teachers**:
Of two faculty members involved in teaching the course sections, one changed between years and the other remained constant.

**Technology**:
All incoming freshmen students were issued iPads by the University in the Fall 2013 class (a resource the 2012 class did not have).

Changes between years which do not belong to a category known to affect learning or student performance, such as room number, were not considered as plausible hypotheses and were not explored.

Of these potential explanations for differences in performance, we preferred the topic hypothesis early based on our prior knowledge. However, we generated this list of alternate explanations and tested our full set of data against each, in an attempt to increase the rigor of our analysis and to avoid the pitfalls of the conceptual *Ladder of Inference* (Argyris, 1990). The *Ladder* is an important thought tool often employed in social sciences, particularly in business, which aims to reduce the effects of assumption, bias, and selectivity on our conclusions and create better overall judgment. It recognizes that we often believe that data supports our assumptions and beliefs because our assumptions and beliefs lead us to look for and select certain data and interpret it in certain ways – recursive loops which lead to faulty conclusions. Any reflective method intended to break possible recursive thought-loops and enhance judgment is useful in research where interpretation and analysis is an important part of the methodology. The conclusions of ex post facto research rely heavily on data selection, interpretation, and analysis, hence our care in questioning all assumptions and actively searching for evidence which might support alternate hypotheses.

## RESULTS AND DISCUSSION

Our analysis of student paper data showed a number of differences in the quality of student research outcomes, but the most surprising and notable for us was the number and quality of sources used. In 2012, students overall relied on non-scholarly websites for 46% of their sources, while in 2013 this number dropped to 11%. In 2012, 17% of student citations were scholarly or popular periodical articles, while in 2013 this number jumped to 44%. The use of books, either print or electronic, also increased from 21% to 39% of all citations year over year. The percentage of scholarly or professional material used, whether article, book, or website, increased from 39% of all sources in 2012 to 82% of all sources in 2013.

This difference in citations suggests that students in 2013 were much better able to find, access, evaluate, and select material that we would consider "high-quality" in support of their paper topics. Our analysis determined all but one of the explanatory hypotheses to be unlikely. Students of both faculty members performed similarly. We did not find the use of iPads a plausible explanation, due to the low amount of time spent using these devices in and out of class. We examined incoming class data, and did not find any demographic shifts or changes in admissions standards that would have influenced outcomes between years. We found a plausible link between the students' access to the local public library, which has a larger and more easily discoverable selection of electronic books than our academic

collection, and the increase in book sources cited, although this cannot account for the other data points. Student feedback on the new IT curriculum indicated that it was disconnected from the rest of the curriculum, making it unlikely this could be an explanatory factor. Topic assignment method, however, is a plausible and likely explanation for several practical and theoretical reasons.

In 2012, a large majority of student papers, developed with totally free choice of topic, were not related to the students' declared major programs. Examples of typical paper titles from this sample group include "The Paris Motor Show"; "Middle East needs to eat healthy foods"; and "Weed: Is it true that it has some good uses?" In 2013, in contrast, students were asked to consider a hypothetical problem that would have ramifications for business, information systems, computer science, and biological sciences—our institution's current major programs. In this instance, we gave the current hot topic in libraries, a zombie apocalypse, as a problem prompt. Students were restricted to considering a major-related problem to investigate and solve, and were required to address their conclusions to an interested decision-maker, such as the leader of a nation. This construct has much in common with some of the practices documented above, as in Stahura and Milanese (2013), Bean (2011), and the assignments investigated by Head and Eisenberg (2010). In this scenario, all paper topics were related to the students' major programs, and for the most part posed questions that they had not explored previously. Students considered problems that would be generated by such a scenario, like difficulty motivating police and defense forces; international trade disruptions; the need for safe methods of remote sensing; and other issues. Examples of typical paper topics from this sample group include "Can big data and data analysis be used to predict zombie outbreaks?" and "How can resources be managed effectively inside safe zones?"

We find it likely and plausible that students had an easier time identifying topic-related sources from our academic collections in 2013, since our collections are built to support the majors. If all topics were major-related, it is logical that students would more easily find a wide array of materials within the library collections to support the topic, including scholarly, professional, popular periodical, and book sources. They were also in the position of employing resources like major-related textbooks from other courses and library finding aids at the beginning of the research process to navigate towards higher quality sources. The 2012 student researching the Paris Motor Show would not have found any library resource guides or textbook chapters to guide him towards major authors and sources, whereas the 2013 student researching resource management would certainly have found many such tools in the immediate academic environment.

We were not able to identify any solid educational theory which would predict or explain any influence from our alternate hypotheses. For example, while there is a large body of work which establishes the benefits of educational technology, the mere presence of iPads in an educational environment is not substantiated as a contributor to better learning outcomes. When it comes to the above topic assignment practice, however, we were able to draw on educational theory which would predict and explain how this might influence student research outcomes. Our knowledge of "deep" and "surface" approaches to learning, for instance, predicts that learning which is linked to practical application, and/or which is problem-based, will be deeper and more substantive, as well as being mediated by greater interest and engagement in the subject (Ramsden, 1992; Atherton, 2013). Additionally, there is an interest among social science researchers in how certain kinds of constraints can promote creativity (e.g., Stokes, 2005). Based on this we hypothesize that the use of limited constraints on topic development, such as requiring topics to relate to a major subject field or to consider applications to a specific problem, not only steers students towards available resources but also may enhance creativity and interest in a way that is superior to offering free topic choice. This sort of background, along with the existing body of practice-based research, increases our confidence that topic assignment method is the best explanation for the improvement in our student outcomes.

This experience puts topic assignment practice into a new light for us as practitioners. In the past, if asked what factors are critical to ensuring research success among novice students, we would have thought that access and retrieval skills development; support from content and library faculty; and/or repeated practice were essential. While we are confident these and other factors are indeed very important, the relative importance of topic selection and assignment practices has risen in our estimation.

## CONCLUSIONS AND RECOMMENDATIONS

We attribute a significant amount of the improvement in the type and quality of research sources used by our students to the topics they selected.  Through ex post facto analysis of our experience and the existing educational literature, we find it probable that assigning a real or hypothetical problem scenario, coupled with a few broad constraints such as subject area and/or intended audience, is superior to assigning free choice of topic to students in terms of student research outcomes.  We do not believe at this time that the nature of the problem or constraints given is significant—these could be tailored for relevance to any course content, major, or special interest.  We further hypothesize that the nature of topic selection or assignment practice carries greater significance to research outcomes than previously thought.  We would like to see these hypotheses tested rigorously using a variety of methodologies in other settings—for example, via action research or experimental methods.  Any subsequent research should take care to consider learning outcomes and learner characteristics as important factors.  We have limited our analysis to undergraduate/novice students in a case where student research skills are the primary learning objective.  We anticipate that other methods of topic selection and assignment practice may be preferable in situations where the learning outcomes are different or where expert learners, rather than novice learners, are involved.  Continued research into this area may assist librarians and faculty members to select topic assignment methods for student research which are demonstrably effective and appropriate for a range of educational settings and learning objectives.

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