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Assessing the Research Process Improves the Product: Results of a Faculty-Librarian Collaboration

Abstract

When an education professor and a reference librarian sought to improve the quality of undergraduate student research, their partnership led to a new focus on assessing the research process in addition to the product. In this study, we reflect on our collaborative experience introducing information literacy as the foundation for undergraduate teacher education research. We examine the outcomes of this collaboration, focusing on the assessment of the process. Using a mixed methods approach, we found that direct instruction supporting effective research strategies positively impacted student projects. Our data also suggest that undergraduate students benefit from not only sound research strategies, but also organization strategies.

Keywords

information literacy, assessment, teacher preparation, research process, research strategies

Disciplines

Education | Educational Assessment, Evaluation, and Research | Library and Information Science

Comments

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**Assessing the Research Process Improves the Product:
Results of a Faculty-Librarian Collaboration**

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April 28, 2013

Abstract

When an education professor and a reference librarian sought to improve the quality of undergraduate student research, their partnership led to a new focus on assessing the research *process* in addition to the product. In this study, we reflect on our collaborative experience introducing information literacy as the foundation for undergraduate teacher education research. We examine the outcomes of this collaboration, focusing on the assessment of the process. Using a mixed methods approach, we found that direct instruction supporting effective research strategies positively impacted student projects. Our data also suggest that undergraduate students benefit from not only sound research strategies, but also organization strategies.

Purposes

Today's students face a variety of new factors impacting the quality of the information to which they are exposed. *Project Information Literacy (PIL)* research reveals that young adults feel overwhelmed by the amount of information available to them, and that they struggle especially with the beginning stages of research. Almost all return to familiar, "tried and true" information sources and research strategies without tailoring their approach to address a particular information need (Head and Eisenberg, 2009a, 2009b, 2010, 2011a, 2011b). Consequently, students do not always find research assignments to be the invigorating investigations that faculty intend them to be, and performance suffers. Focusing on improving student information literacy can positively impact student learning and the quality of their research.

Our changing information landscape has prompted changes in student learning goals, and our pedagogical methods must also change if we are to continue to support innovative, reflective thinkers within and beyond a liberal arts community where student and faculty research blend (Trilling and Fadel, 2012; Jastram, Leebaw, and Tompkins, 2011). According to *Project Information Literacy*,

information literacy skills greatly impact the success of our current undergraduates as well as their ability to succeed following graduation (Head and Eisenberg 2012). If course assignments, projects, and readings are designed to help students improve their information literacy, our graduates will re-enter our digital society with newfound skills, including but not limited to initiating research, analyzing information, and synthesizing information in order to develop innovative ideas to share within their field and beyond (Wolf, 2008; Vorgan and Small, 2009; and Scharf, Elliot, Huey, Briller and Joshi, 2007). Research shows that integration of information literacy within an authentic context appropriately challenges students to think in order to shape and explain their world (Oakleaf, 2009; Trilling and Fadel, 2012); undergraduate coursework serves as a platform for each of us to provide students with such an intellectual challenge. However, current pedagogical practices do not always ensure that students meet this challenge effectively or efficiently. Therefore, this study examines how a new collaboration between a professor and librarian impacted students' information literacy skills in a 300-level course.

Information professionals assert that students who are asked to explain the thought process behind their research and who are assessed on that process are more likely to create original work (Gilchrist and Oakleaf 2012), yet there are few studies that have explored the research as a *process* rather than a *product*. The present study analyzed one 300-level teacher education course as the students prepared for two separate research assignments: a 75-minute interactive oral presentation and a poster to be presented to various community stakeholders. This paper will discuss the importance of being reflective practitioners in the field as well as report the results from an examination of our students' research strategies. For the purposes of this paper, our initial research focused on one overarching research question, "What were the outcomes of collaborative efforts between a reference librarian and instructor to build a strong foundation of research strategies for pre-service teachers?" We also asked two related sub-questions:

1. How did the research process develop over time?

2. How did students' research practices change over time?

While our initial questions focused on student research, our later reflections also prompted us to consider elements of our collaboration, such as the design of our teaching environment and how we hoped to impact student learning.

Theoretical Framework

We used Cochran-Smith and Lytle's notion of an inquiry stance (Cochran-Smith and Lytle, 1993, 1999a, 2009) as an organizing theoretical and pedagogical framework. In this approach, teachers are empowered to work together to co-construct knowledge-of-practice and serve as agents of change in their classrooms. Action research, or systematic inquiry into problems of practice, serves as the primary tool for guiding teachers toward ownership of knowledge and skills for critical reflection (Dana and Yendol-Hoppey, 2009; Mills, 2010). Action research has been highlighted across the literature as a powerful teacher education practice (Grossman, 2005), noted for its ability to illustrate candidate's understandings about teaching and learning (Darling-Hammond, 2006), foster social justice (Zeichner, 2009), and facilitate professional growth (Ball and Cohen, 1999).

Self-studies of action research abound in the teacher education literature and typically examine its affordances and constraints in context. Some prominent examples of self-studies have explored the outcomes of action research on teacher and student learning (Cochran-Smith, Barnatt, Friedman, and Pine, 2009), teacher reflexivity (Smith, Yendol-Hoppey, and Milam, 2010), and personal and institutional development (Valli, 2000; Valli and Price, 2005). Additional analyses look at action research as a tool for fostering emancipatory practice (Gore and Zeichner, 1991) and the process of thinking like a researcher (Christenson, et al., 2002).

Mode of Inquiry

One 300-level teacher education class with a total of twelve students participated in this project. The students' research skills were analyzed at the beginning of the study and again at the end of the

study using a rubric (Figure 1). The researchers for this study included the professor of record, a reference librarian, and two education students. Prior to the project, the reference librarian and the professor discussed how the project would be structured and executed in hopes of avoiding the poor assignment quality seen in previous semesters. The two began with a discussion of the final project and how this project focused on assessing a *product* of research, rather than the *process* of research. Realizing that a better research process would lead to a better research product, the two agreed that a closer examination of how students actually conduct research was in order. They asked the students to create fifteen-minute recordings of their current research practices using an online tool, Screencast-O-Matic; this tool captures the audio and screen movements employed by the user and was chosen because it is free, web-based, and platform neutral (see <http://www.screencast-o-matic.com>). Students used a “think-aloud” process to share their thoughts as they made decisions during their individual online research process. This initial video log (recorded between the first and second day of classes) served as a baseline. (See Appendix I.)

Our first intervention took place on the second class day, just after the students created their first video research logs. The reference librarian led the class through a series of active learning exercises designed to improve their research process. Students began by reporting on their typical research tools and strategies; these were used to create a collective concept map of research tips. The librarian then introduced a database of reference books to use for background information. Next, students explored various disciplinary databases in pairs and shared with the entire class. The concept map was referenced during the reports to reinforce the use of various tools and highlight their context within a universe of research options. This class session was intended to give the students a stronger foundation for their individual research than they would have had otherwise.

The next intervention occurred when the students were in the midst of their individual research. Students were asked to schedule individual appointments with the librarian about a week before their

in-class presentations. Students were to bring the sources they had found so far, as well as questions regarding sources they still had not found. The librarian used the research process rubric during this conference in order to provide feedback to the students about their research skills. Eight out of the twelve students participated in this conference.

Using quality sources, students were able to create innovative, interactive, and informative presentations. Classmates eagerly took notes on the shared information. After students shared their findings via an engaging presentation, the instructor evaluated it with a rubric and provided constructive feedback regarding both content and delivery. The instructor concluded that there was improvement in presentation content compared to previous semesters' work.

Students then began new research for their poster presentations. They were asked to create another fifteen-minute video research diary for the researchers to examine later. The poster assignment was designed to hone existing research skills, further extend the students' application of research skills, and provide a platform to share the results of their research process in a public forum. The posters were shared with various community stakeholders at the end of the semester, and the instructor evaluated these research products with a rubric.

Data Sources

In action research studies, data collection is a result of systematic and intentional study of one's own practice with the goal of improving that practice (Dana and Yendol-Hoppey, 2009). A related methodological goal of the present inquiry was to base documentation upon evidence taken from the daily life within the college classroom (the in-class presentations and poster presentations) and beyond it (the video research diaries). Different types of data collection techniques were used throughout the course of this study, so that the multiple data sources could be used to validate the findings (Maxwell, 1996). The different methods of data collection identified possible findings for the three research questions discussed in this paper. The instruments included (a) transcriptions of both sets of video

research diaries, (b) instructor's notes, (c) librarian's lessons, (d) librarian's conference notes, and (e) completed research projects (oral presentations and posters).

Results

Our initial analysis suggested that this new focus on improving research strategies helped students improve their overall information literacy and class performance. The baseline video research logs collected at the beginning of the semester showed that students relied most heavily on various search engines (such as Google) to limit and prioritize search results. Consequently, some of the research results did not include the most appropriate sources to be included in an education presentation. Students did not select the best sources because they had not used the most appropriate tools to find their sources, such as disciplinary databases and streaming video databases from the library. Analysis of the second batch of video research logs (collected near the end of the semester) showed new use of scholarly research tools such as ERIC, Education Abstracts, the library catalog, and the library discovery platform. Video clips were more likely to come from published documentaries rather than YouTube. The researchers were pleased that the new interventions had a positive impact on student performance. Next, they turned attention to the new research process rubric, hoping to better codify desired student research behaviors.

Recall that the librarian and instructor constructed a rubric to capture the research process prior to the start of the semester (Figure 1). As we used this rubric to evaluate student research we soon realized that it did not measure the process as well as we had hoped. The librarian, instructor, and student researchers discussed and revised the rubric and used the new version to score the video logs (Figure 2). The revised rubric can now be used as more than an assessment tool – it can be shared with incoming students as an instructional tool. The instructor and librarian can use the rubric when planning future lessons. We anticipate that the improved rubric will lead to improved learning to be generated from future students.

We began the semester hoping to support students' learning by assessing their research process, but in the process of assessing their research process, we identified ways to improve our own teaching of the research process as well as their learning of the research process. We established a collaborative practice of inquiry within our classroom. Here is an example of how this collaborative practice of inquiry generated pedagogic change. Because the video research logs recorded authentic student research behaviors, we were able to identify a critical skill gap we had not noticed before: students still need help *organizing* their research. The videos showed that most students utilized haphazard techniques to save or organize the results of their research, and many attempts failed. Only one of the students implemented a systematic method for securing citations, downloading copies of texts, and saving secure web links (we later determined that the student had unusually high research skills thanks in part to a Mellon Summer Scholar fellowship). The researchers found it very disheartening that so many students relied on the first few pages of results from one search engine and that so many students failed to successfully save the sources they intended to. In response to this finding, we introduced an additional instruction period devoted to research organization during the next semester in which the course was taught. The librarian covered topics like saving source citations, formatting citations, downloading articles, and using databases to make the research process more efficient, and the instructor provided further support and accountability in order to positively influence student research habits.

We made a few more changes in the fall 2012 class design, as well. We decided to show some of the spring 2012 videos during the library visit, particularly ones which demonstrate how a student may organize ideas during the research process. We made the research process rubric more "public" by sharing it in the fall 2012 syllabus. Finally, we allowed students to make individual appointments with any reference librarian, not just the one who conducted the research instruction sessions with the entire class.

Figure 1: Initial research process rubric

	Exemplary	Satisfactory	Needs Improvement
<p>Search Strategies</p> <p>HOW did you discover these sources?</p> <p><i>When you meet with the librarian, be prepared to share evidence that demonstrates your research process.</i></p>	<p>Brainstormed many keywords, categories, and related terms that opened the research topic.</p> <p>Expanded and refined list(s) of relevant search terms by evaluating and refining initial search results</p> <p>Searched different types of tools (catalogs, article databases, websites, curricula)</p> <p>Employed Boolean operators, truncation, and other advanced search strategies to broaden or narrow searches as appropriate.</p> <p>Followed references/citations listed in in-hand sources.</p>	<p>Brainstormed some keywords, categories, and related terms that began to open the research topic.</p> <p>Began to refine relevant search terms by evaluating and refining initial search results</p> <p>Searched different types of tools (catalogs, article databases, websites, curricula)</p> <p>Employed Boolean operators, truncation, and other advanced search strategies to broaden or narrow searches as appropriate.</p> <p>Followed some references/citations listed in in-hand sources.</p>	<p>Brainstormed limited keywords, categories, and related terms that began to open the research topic.</p> <p>Began to refine search terms by evaluating and refining initial search results</p> <p>Searched few types of tools (catalogs, article databases, websites, curricula)</p> <p>Began to employ Boolean operators, truncation, and other advanced search strategies to broaden or narrow searches as appropriate.</p> <p>Followed limited references/citations listed in in-hand sources.</p>
<p>Identification & Selection of Sources</p> <p>WHAT sources have you gathered?</p> <p><i>Hint: gather far more than you expect to use!</i></p>	<p>Identified a range of highly appropriate sources. Demonstrated consideration of sources that vary by:</p> <ul style="list-style-type: none"> • Publication format (reference books, books, articles, websites, films, lesson plans, other media...) • Author (scholars from relevant disciplines, journalists, laypersons, other) • Audience (scholars, students, parents, laypersons, other stakeholders) 	<p>Identified some appropriate sources but made limited attempts to balance some of the following format types:</p> <ul style="list-style-type: none"> • Publication format (reference books, books, articles, websites, films, lesson plans, other media...) • Author (scholars from relevant disciplines, journalists, laypersons, other) • Audience (scholars, students, parents, laypersons, other stakeholders) 	<p>Identified few appropriate sources and made little attempt to balance few of the following format types:</p> <ul style="list-style-type: none"> • Publication format (reference books, books, articles, websites, films, lesson plans, other media...) • Author (scholars from relevant disciplines, journalists, laypersons, other) • Audience (scholars, students, parents, laypersons, other stakeholders)

	<ul style="list-style-type: none"> • Source type (primary, secondary, and even tertiary) • Perspective • Context (including historical) 	<ul style="list-style-type: none"> • Source type (primary, secondary, and even tertiary) • Perspective • Context (including historical) 	<ul style="list-style-type: none"> • Source type (primary, secondary, and even tertiary) • Perspective • Context (including historical)
<p>Quality / Evaluation</p> <p>HOW WELL did you edit your initial research results?</p>	<p>Cited only high quality sources that strongly supported the thesis or claim.</p> <p>Sources represent intellectual choices made in service of a thesis or claim.</p> <p>Final bibliography exhibits no gaps in background research.</p> <p>Research gaps identified earlier in the process have been filled or otherwise adequately addressed.</p>	<p>Cited some quality sources that supported the thesis.</p> <p>Some sources represent intellectual choices made in service of a thesis or claim.</p> <p>Final bibliography exhibits some gaps in background research.</p> <p>Attempts have been made to fill the identified research gaps.</p>	<p>Cited few quality sources that provided limited support for the thesis.</p> <p>Some sources represent intellectual choices made in service of a thesis or claim.</p> <p>Final bibliography exhibits some gaps in background research.</p> <p>Research gaps identified earlier in the process have not been filled or otherwise adequately addressed.</p>

Figure 2: Revised research process rubric

	Exemplary	Satisfactory	Needs Improvement
<p>Search Strategies</p> <p>HOW did you discover these sources?</p> <p><i>When you meet with librarian, be prepared to share evidence that demonstrates your research process.</i></p>	<p>4 Brainstormed many keywords, categories, and related terms that opened the research topic</p> <p>4 Expanded and refined list(s) of relevant search terms by evaluating and refining initial search results</p> <p>4 Searched many different types of tools (catalogs, article databases, websites, curricula)</p> <p>3 Employed Boolean operators (other than AND), truncation, and other advanced search strategies to broaden or narrow searches as appropriate</p> <p>3 Followed references/citations listed in in-hand sources</p>	<p>3 Brainstormed some keywords, categories, and related terms that began to open the research topic</p> <p>3 Began to refine relevant search terms by evaluating and refining initial search results</p> <p>3 Searched a few different types of tools (catalogs, article databases, websites, curricula)</p> <p>2 Began to employ Boolean operators (other than AND), truncation, and other advanced search strategies to broaden or narrow searches as appropriate</p> <p>2 Followed some references/citations listed in in-hand sources</p>	<p>1 Brainstormed limited keywords, categories, and related terms that began to open the research topic</p> <p>0 Did not refine search terms by evaluating and refining initial search results</p> <p>1 Searched 1-2 types of tools (catalogs, article databases, websites, curricula)</p> <p>0 Did not employ Boolean operators (other than AND), truncation, or other advanced search strategies to broaden or narrow searches as appropriate</p> <p>0 Did not follow references/citations listed in in-hand sources</p>
<p>Identification, selection and organization of sources</p> <p>WHAT sources have you gathered? HOW did you organize and keep track of them?</p> <p><i>Hint: gather far more than you expect to use!</i></p>	<p>4 Identified a sufficient number of appropriate sources Sources were balanced by:</p> <ul style="list-style-type: none"> • 2 Publication format (reference books, books, articles, websites, films, lesson plans, other media...) • 2 Author (scholars from relevant disciplines, journalists, laypersons, other) • 2 Audience (scholars, students, parents, 	<p>2 Identified some appropriate sources</p> <p>Made limited attempts to balance sources by:</p> <ul style="list-style-type: none"> • 1 Publication format (reference books, books, articles, websites, films, lesson plans, other media...) • 1 Author (scholars from relevant disciplines, journalists, laypersons, other) 	<p>1 Identified few appropriate sources</p> <p>Did not balance sources by:</p> <ul style="list-style-type: none"> • 0 Publication format (reference books, books, articles, websites, films, lesson plans, other media...) • 0 Author (scholars from relevant

	<p>laypersons, other stakeholders)</p> <ul style="list-style-type: none"> • 2 Publication date (as appropriate for topic) <p>2 Always saved/ copied/ emailed/exported relevant source citations found during research</p> <p>2 Always saved/copied/emailed/exported or otherwise obtained relevant full text sources found during research</p>	<ul style="list-style-type: none"> • 1 Audience (scholars, students, parents, laypersons, other stakeholders) • 1 Publication date (as appropriate for topic) <p>1 Sometimes saved/copied/ emailed/exported relevant source citations found during research</p> <p>1 Sometimes saved/copied/ emailed/exported or otherwise obtained relevant full text sources found during research</p>	<p>disciplines, journalists, laypersons, other)</p> <ul style="list-style-type: none"> • 0 Audience (scholars, students, parents, laypersons, other stakeholders) • 0 Publication date (as appropriate) <p>0 Did not save/copy/ email/ export any source citations</p> <p>0 Did not save/copy/ email/export or otherwise obtain any full text sources, or copied part of a source w/o saving citation</p>
<p>Quality/Evaluation</p> <p>HOW WELL did you edit your initial research results?</p>	<p>Here, use the score assigned by instructor in the class presentation rubric. Use only the points from the <i>Description</i> and <i>Educational Context</i> sections of the rubric (do not use the <i>Presentation</i> score, which focuses on oral communication rather than quality of research). This measure is more associated with the final product of research rather than the process.</p>		

Scholarly Significance of the Study

The findings of this research support the theoretical rationale presented earlier in this paper. The suggested implications for teaching, while being grounded in the inquiry framework, drew from the theorists that influenced the current study. The present study highlights the complexity of research implications that are found in teacher education undergraduate courses. Each semester, instructors inherit a group of multidisciplinary students with very different and numerous research experiences that influence how they gather information. It is thus important for educators to provide venues in order to share their newly found knowledge and experiences. As instructors it is our professional commitment to work toward creating such experiences for each of our students.

Although educational institutions and instructors “talk about and teach separate interpretive activities,” reading, viewing, listening, speaking, thinking, and writing, our students “actually live in whole cultures and bring insights from one medium into their approach to another” (Mackey, 2002, p. 50). It is very difficult to teach students to try a new research method until you show them that their “tried and true” methods often limit and / or negatively impact their results (Head and Eisenberg, 2009b). Today’s students “... actually read within the framework of a sophisticated context that includes numerous forms of media, multimedia, and cross-media engagement” (Mackey, 2002, p. 51). Against such backdrops, this study generated five implications for teaching that will be of relevance to future research: (a) use of rubrics to guide research process instruction, (b) teaching research skills prior to and during authentic research projects, (c) bringing multidisciplinary experiences and knowledge to the research, (d) transferring research skills to other contexts, and (e) orally sharing thinking and reasoning while researching to publicize the private research techniques of individuals for the benefit of other students.

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Appendix I

Creating a Video Research Diary

You will use **ScreenCast-O-Matic** to create a 15-minute video research diary. The diary will include screen capture and an audiorecording of your voice. Please verbalize your thoughts as you do your research – understanding why you do what you do will help us!

What is ScreenCast-O-Matic?

- See <http://www.screencast-o-matic.com/>
- Online screen recorder
- One-click recording from your browser on Windows, Mac, or Linux
- No install, no account registration or setup
- FREE



Before you begin

- Make sure you know how to access your H: drive. This is a network drive that stores up to 750 MB (you'll need about 75 MB of free space to complete this assignment). When you log in to lab machines on campus, you automatically see your H: drive. If you haven't already mapped your H: drive to your personal computer, see the instructions provided by IT at http://www.gettysburg.edu/about/offices/it/io/cs/tech/accessing_your_h_drive.dot.
- Make sure your Java is working and updated (you need Java 1.5 or later). <http://java.com/en/download/testjava.jsp>
- Make sure you have a microphone. (If you are using your laptop, you probably have one built in. If you are using a desktop machine without a microphone, you may borrow one at the library. Ask at the circulation desk.)
- Make sure you have a thumb drive with about 75 MB of free space. (If you don't have a thumb drive handy, you may purchase one in the office supply vending machine on the library's main floor.)
- If prompted, you need to allow the java plugin.
- Watch the quick demo online: <http://www.screencast-o-matic.com/watch/cXhbbqb9C>
- Make a very short test video to make sure you can capture both your screencast AND your voice. One tester recording at a computer lab had to change a setting so the computer recognized the microphone – so don't skip the test step! Make sure you are capturing as much

of your screen as possible – but I suggest leaving a small space at the bottom so that the S-O-M controls don't obscure your taskbar. The S-O-M control box isn't resizeable.

- Then proceed with your assignment.

Your assignment: Record a 15-minute video research diary

- Spend ONLY 15 minutes beginning to research and find materials for your presentation (see syllabus for details about this assignment). Record the FIRST 15 minutes you spend on this project. There are no right or wrong answers. We want an honest peek at how you begin to tackle a research assignment.
- Remember that if you need to PAUSE your recording, use ALT-P (though I had best results when I never paused).
- When you are done:
 - Choose the **SAVE TO VIDEO FILE** option. (You needn't preview the video – it will take time and you're not going to revise it anyway!)
 - Save as **Quicktime (MP4)**.
 - Name your file **researchlog1stebick** (but use your own last name, not mine!).
 - Save it to your H: drive. *This will take a few minutes – be patient.* My 15-minute video file is 62.1 MB in size.
 - Then copy the file to a thumb drive and bring this to class to “turn it in.” Files will be transferred to the education department's network drive. Your video will not be publically available.
- **You must complete your video research diary before class on Thursday, 8/30/12.** Bring your thumb drive to class on 8/30.