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The Effectiveness of Badging in Community College Library Instruction

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INTRODUCTION

For the present study, we assess differences in student performance between community college students who had and had not participated in our library's "Research Basics" instructional badging program. We combine quantitative and qualitative assessment of student performance. When given prompts for two hypothetical research assignments, students selected one source for each, then narrated their search and evaluation process using a "think aloud" method. Librarians rated the sources chosen by students according to a rubric derived from the Association of American Colleges and Universities Information Literacy VALUE rubric. We found that the students who had earned badges were more familiar with library resources and better at articulating the value of a library, yet there were no significant differences in the ability to evaluate information sources of students who had or had not earned the badges. As discussed at length below, this finding informed a redesign of our source evaluation badge. Most prominently, our evaluation badge has shifted from emphasizing the CRAAP criteria to using the SIFT Moves as the basis for evaluation instruction, along with an introduction to hallmark indicators of more reliable sources.

BACKGROUND

It would be a rare librarian who has not yet encountered a digital badging program in higher education, either within their own library or through an instructional collaboration with another department or institution. Microcredentialing has been widely adopted across education over the last decade as a potential solution for a variety of identified curricular gaps, or as a strategy to leverage staff and instructor time towards greater student learning.[1] As badges have been implemented in such a breadth of circumstances and for such different ends, their effectiveness in achieving their intended goals has accordingly

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been inconsistent at best. While some have found badging to be effective in library instruction, others have reported discouraging results.[2]

Our move to a badges-based model of foundational library instruction was a response to two primary motivating concerns: (a) the unproductive repetition of truly "foundational" information about the library in our information literacy sessions, and (b) the potential for a "flipped" model to produce better student learning outcomes in the classroom. We also saw the potential for badges to make information and library skills more "visible, equitable, and portable", as suggested by a 2016 article by Stephanie West-Puckett.[3] These are especially critical concerns at the community college level, where students arrive at our doors with a wide range of backgrounds, training, and academic preparation. At the time, the three courses that our librarians visited the most for research instruction were a first-semester experience course, a Communications course, and an English composition course. None of them had prerequisites, which means that many students would take all three in the same semester, while others would wait until their last semester to take one or more. The assignments and schedules also varied widely between sections of these courses, making it impossible to reliably scaffold a progression from introductory information to more advanced concepts across our instruction sessions with these three courses. While a substantial portion of students in any given section of these classes might already have benefitted from a library instruction session in one of the other two, enough students needed to be shown the basics that we had to regularly repeat the same elements. This necessary but unproductive repetition frustrated students and librarians alike.

We knew from the literature that having students engage with material and complete small assignments before working synchronously with a librarian to reinforce and extend that material would likely increase student engagement, learning outcomes, and perceptions of the instruction session overall.[4] The format of badges would make these concepts, as well as library services in general, more prominent and perceptible. We hoped that flipping the material would be more equitable, as each student could individually take the time or receive the support they would need to fully comprehend the material, rather than compressing the opportunity for instruction to a normative idea of what a student "should" be able to comprehend and retain from a one-shot instruction session. We also realized that if we could provide "credit" for having already completed some of this pre-class work, we would be able to honor students' demonstrated knowledge from library instruction they'd encountered in a previous course. Flipping this basic knowledge to "pre-work" offered us the chance to reclaim classroom time for instruction and activities more clearly tailored to the individual section's assignment. Accordingly, we began a small pilot in which we provided individualized digital certificates when students had completed the online badge modules.

CURRENT STUDY

In January 2017, after a successful smaller badging pilot and a series of conversations with faculty and Center for Teaching and Learning staff, our library launched an instructional badging program focused on the development of foundational information literacy skills in first-year community college students. The badges are offered inside our Learning Management System, Blackboard, as a set of four microcredentials that intend to provide students with the baseline knowledge we had determined to be most critical for their success. The badges in this "Research Basics" badge set are:

1. "Crossed the Threshold" Badge introduces students to the services, resources, and staff at the library;
2. "Find It!" Badge provides students with the fundamentals of where and how to search for books and articles through the library;
3. "Source Sifter" Badge [previously "Website Crusher" Badge] provides students with tools and strategies to effectively evaluate sources; and
4. "Asked a Librarian" Badge awards credit to students simply for contacting the library and overcoming their library anxiety.

Our badges were immediately and enthusiastically adopted by faculty, who now require students to complete them in a wide variety of courses across the curriculum. Their most significant implementation is in our first-semester experience course, Connecting with Ideas (CWI) 101, which includes multiple student learning

outcomes related to the library and information literacy. As of March 2021, our students have earned nearly forty-five thousand badges. Clearly we had achieved buy-in, but we were left with the critical question: Were the badges working?

After two years of using the badging system, coupled with in-person teaching, we had received glowing anecdotal feedback but remained unclear on the question of whether our badges were effective at helping students gain baseline familiarity with library services and foundational research skills. Were students absorbing information from them or were they just taking the quizzes until they passed them? Furthermore, if students were learning from the badges, were there gaps in what they were being taught? Had we missed any crucial pieces? Were we teaching those concepts in a way that actually increased student learning?

To address our questions, we spent a year conducting research with CWI 101 students. We interviewed students who had earned our badges as well as those who had not, in order to determine whether our work was having an impact upon their ability to achieve related course outcomes. We recorded their research processes and interviewed them to learn about how they perceived the assignment, conducted their initial searches, and evaluated and selected sources.

METHODS

The challenge we faced was how to assess our students' ability to apply what they learned through the badges. To recruit participants for our research, we initially selected a random sample of students taking CWI 101 in the Fall 2018 semester and sent them an invitation to interview with us. Due to a low response rate, we ultimately expanded the invitation to all students taking CWI 101 during the 2018-19 academic year, an overall population of 2,516 students. Furthermore, as an incentive, students who participated in an interview were given two movie ticket vouchers in compensation for their time. Students who agreed to participate in the study were sorted into our "badger" (experimental) and "non-badger" (control) groups based on information from our gradebook in Blackboard, which tracked badge completion. Only our Lead Investigator had access to the records of which participants were which, in order to avoid bias in those assessing and interviewing students.

At each interview, we provided students with a laptop computer and asked them to conduct two separate exercises in which they searched and selected sources for a theoretical assignment. For each exercise, they needed to locate a source they would use for an essay on a particular topic. The first was "climate change," and the second was "refugee immigration in the United States." When the participant was ready to complete the exercises, the interviewer set up the laptop to record all activity, then left the room while the interviewee conducted the search in private. The supplied computer made a screencast using Camtasia of the student's activities during the exercise. After the student finished the two tasks, they notified the interviewer. At that point, the interviewer would return and conduct a "think aloud" interview with the student, recording the student's audio explanation of their search procedure and evaluation criteria as they reviewed the video. Interviewers were instructed to ask open-ended "how" and "why" types of questions in order to invite student reflection while avoiding leading or evaluative questions or statements.

RESULTS

Quantitative Data

We completed fifty-two interviews with students, thirty-one of which were with students who had completed our badges, and the remaining twenty-one were students who had not. Upon completion of those interviews, we anonymized the videos and transcripts. We subsequently rated each interviewee's selected source, search procedure, and evaluation criteria against a rubric we developed, itself based on the Information Literacy VALUE Rubric (see Table 1).

Our quantitative results indicated that our badges had achieved notable gains in certain learning outcome areas, while having less impact in others. For instance, our greatest increase in the mean ratings between badger and non-badger students was #4, "Reflects awareness of library value," indicating that even where they may not

TABLE 1

Interview Scoring Rubric

Criteria	1	2	3	4	5
Identifies information need	Does not identify an information need ex: minimal keywords ex: Can't differentiate between ads and top search results ex: Doesn't appear to understand what it means to search for a paper/ assignment ex: Struggles to identify sources of interest	Searches randomly without determining what information is needed ex: Aimlessly scans search results to select a source that is familiar or interesting ex: Understands what it means to search for a paper/assignment	Expresses understanding of some information need without actually defining it and without matching search strategy to need ex: Purposefully scans search results ex: Seeks outside source recommendations/ author info instead of choosing randomly ex: Searches with assignment in mind	Conducts search based upon a defined information need ex: Takes ownership of topic, shows agency	Searches effectively based upon a defined information need
Refines research topic	a) Does not refine topic b) Does not select keywords beyond those given in instructions	a) Minimally refines topic b) Selects broad keywords that do not contribute towards focusing search ex: adds one broad keyword, such as "statistics" ex: uses quotes ex: refines pub dates	a) Passably refines topic b) Selects keywords that contribute towards focusing search ex: adds multiple broad keywords	a) Significantly refines topic b) Skillfully selects targeted keywords that narrow search ex: selects keyword based upon identified research subtopic	a) Creates research question b) Thoughtfully selects and combines keywords that focus search ex: Uses Boolean logic

have acquired the specific skills or knowledge intended, their badging experience had reinforced the importance of the library in supporting their research endeavors (see Table 2). Students who completed the badges were more likely both to be aware of the library as a resource for their assignments and to seek out sources through the library's catalog and/or databases. We also saw smaller gains in two additional areas of our rubric, #3, "Selects and demonstrates understanding of appropriate platform" and #5, "Selects high-quality sources." While badgers did not show as much improvement in these areas as compared to non-badgers, they did tend to seek out sources through the library's catalog and/or databases, which ultimately led them to higher-quality sources. In some cases these students still chose to search for sources outside of the library's collection, but were more likely to use Google Scholar and similar online tools in their search.

On the other hand, there was one significant area in which we saw no improvement at all between non-badgers and badgers. We were concerned by the fact that the scores on #5, "Evaluates sources," showed such a small difference as to be insignificant between students who had completed our badges and those who had not. This became a theme in our ongoing data analysis and was reinforced in our qualitative results.

Qualitative Data

In order to generate qualitative data, we generated a transcript of each interview, uploaded and coded it by theme using Taguette.[5] In analyzing transcripts and students' resource selections, we discovered that the primary stumbling block for students was their ability to apply the concepts they had learned to the practice of research, especially related to source evaluation. In general, students understood that they should be careful to select

TABLE 2

Interview Scores

Mean ratings overall

	#1 Identifies information need	#2 Refines research topic	#3 Selects and demonstrates understanding of appropriate platform	#4 Reflects awareness of library value	#5 Evaluates sources	#6 Selects high-quality sources
Badgers	5.05	2.97	5.61	5.39	4.20	6.66
Non-Badgers	4.81	3.18	4.80	3.60	4.06	5.83
Difference	**0.24**	**-0.21**	**0.81**	**1.80**	**0.14**	**0.84**
*average value						

Median ratings overall

	#1 Identifies information need	#2 Refines research topic	#3 Selects and demonstrates understanding of appropriate platform	#4 Reflects awareness of library value	#5 Evaluates sources	#6 Selects high-quality sources
Badgers	5.00	2.67	6.00	6.00	4.00	7.00
Non-Badgers	4.83	3.00	4.33	2.00	4.00	5.67
Difference	**0.17**	**-0.33**	**1.67**	**4.00**	**0.00**	**1.33**
*middle value						

Mode ratings overall

	#1 Identifies information need	#2 Refines research topic	#3 Selects and demonstrates understanding of appropriate platform	#4 Reflects awareness of library value	#5 Evaluates sources	#6 Selects high-quality sources
Badgers	4.00	2.00	6.00	6.00	4.00	7.00
Non-Badgers	4.00	2.00	4.00	2.00	4.00	6.00
Difference	**0.00**	**0.00**	**2.00**	**4.00**	**0.00**	**1.00**
*most-repeated value						

credible sources and were often able to regurgitate terms from the CRAAP Test or other instruction relevant to information evaluation, but they failed to effectively apply those concepts to the sources they located. We saw this consistently across the board in both badger and non-badger students. Students commonly scrolled through results waiting for something to "catch their eye," and described sources as credible if they were already familiar with the publisher or if the website had a trustworthy URL (typically defined as a ".org" or ".gov" website). They struggled to determine what sources were credible, often creating arbitrary or personal criteria for selecting information or resources. While they retained terminology and/or abstract concepts from prior instruction, they had not integrated that information into their research process. Most of all, they mentioned and misapplied the frequently-taught "CRAAP" evaluation criteria, which we had included in our badges.

It became clear over the course of evaluating videos and transcripts that students were treating CRAAP as a checklist. They knew the words in the acronym, but they did not fully grasp the critical thinking concepts or the evaluation meant to underlie each word. Each word was treated as a shorthand to check off, rather than a concept to investigate. Does it have an author? Then it has authority. Does it have data? Then it's accurate. To

best illustrate our qualitative findings, the next section of this paper provides examples of student reflections and commentary from the interviews in the context of each concept from the CRAAP Test.

Currency

Currency was by far the most accessible of the evaluation concepts, and students almost without exception showed great awareness that having current information was important. However, they weren't necessarily clear on why they thought more recent information was important or helpful. For instance, one student described selecting a source in part because "it was dated and it was pretty recent from the last like few years,"[6] while another describes seeking out "present sources."[7] They generally noticed publication dates on their sources and would select more recent sources, expressing the idea that these would be more timely and relevant to current events. They did not generally appear to recognize that the importance of currency as a criteria varies depending upon their research topic.

Relevance

Relevance was the primary criteria employed by students in their source selection, although not in the way it is typically defined. Most students equate relevance to what they find "interesting" or what "catches their eye" in a search. One student scrolled through search results, saying "I was just trying to read to see…if anything was relevant to me,"[8] while another commented, "the title grabbed my attention and…I don't know anything about the website but I thought it was definitely worth looking at it."[9] Similarly, Interviewee Nineteen noted, "I felt like this one looked pretty interesting because it had a lot of like facts on it."[10] Meanwhile, some students create their own personal formulas to drive their search strategy. For instance, one student explained, "I usually don't open the article if it doesn't have at least…two words out of the topic that I'm looking…because…the more words it has from your topic the more related."[11]

Even more importantly, students consistently determined the relevance of a source by whether it aligned with their own beliefs. Rather than evaluating sources objectively, they evaluated them based upon their value system and the opinions about the topic they held before approaching their research. Relevance in this case becomes "relevant to me" and not "relevant to the topic I'm researching." Reflecting on the source they selected, one student explained, "It seemed like it fit very well and…it goes along with my beliefs and things like that and so I chose it."[12] A second student described looking for: "really things that matter to me."[13] Memorably, another student commented on their search strategy this way: "I want a book that says…take care of the environment or you will die and instill that type of fear into people… but people don't see to have the same type of urgency I do."[14] This is further confounded by the fact that they rarely form a researchable topic before jumping into the search, rather they search using the broad assignment terms and select those sources that appeal to them. They search broad topics that they have not refined to the fit the purpose or scope of their assignment, and seek out sources that provide general information that aligns with their preconceived notions of the issue. According to one student, "I was trying to find a source that wasn't really too specific 'cuz I wasn't looking for like a specific part of climate change."[15]

In this way, they are not taking the opportunity to learn more about the topic through their research, but rather they are using the assignment an opportunity to build a case that reinforces their pre-existing ideas about it. In an academic setting, this is problematic on multiple levels and creates a barrier to their ability to engage with the inquiry process.

Authority

Students' understanding of authority is typically based upon their recognition of the website, publisher, or organization. For instance, one student described determining the legitimacy of a source by "if I've heard of it mostly like CNN, NBC and if there's an author if it has like '.org' or something that usually is what I use."[16] At other times their assessment of authority depends upon their interpretation of whether a website or organization's name sounds legitimate upon first impression and without seeking out any further information about it. Interviewee

Fifty-one recounted their source selection: "So right here I mean I read 'Proceedings of National Academy of Sciences of the United States of America.' Even though I don't know what that is it sounds pretty official, it sounds like a, um, accredited, um, association."[17]

Students frequently used web suffixes as a sufficient marker of authority or reliability. They often mentioned looking specifically for sites with ".org," ".edu," or ".gov" endings with varying levels of understanding about the credibility of such sites. A large number of students in this study considered ".org" websites to be consistently credible without further investigation. One student noted about their chosen source, "it had the '.org' and it came up in Google Scholar so I assumed that it was a good source to use."[18] Others affirmed the opinion that ".org" sites were consistently reliable, for instance, one student explained, "I was also trying to find one that was credible like '.org' or '.gov' something like that."[19] Others referred to ".org" sites as an "accredited source"[20] or a "reliable source."[21]

Meanwhile, students would frequently turn away from a website page that did not specifically list an individual author, assuming that if an author is not credited on the page, the information could not be authoritative. "Normally I scroll down to see if I can find an author," noted one student, "because I don't necessarily really like using just an online source with no author so if I can't find one I normally don't use that website."[22] Another described skipping over their favorite found source, saying "it was tons of just straight up scientific data, it was the opposite of an opinion piece so exactly what I would have wanted…but couldn't find the author so I settled for second best."[23] Similarly, Interviewee 43 reflected, "the UN one was really nice but I couldn't find an actual author for it."[24] This was particularly problematic on government and organizational websites, which frequently do not list individual authors on their webpages and reports. Further, some students considered sources with multiple authors to be more credible than a single author, regardless of the authors' credentials.

Only a few students made any attempt to verify the authority of an unknown website by reviewing its "About" page or obtaining more information about it from third-party sources. More advanced students specifically sought out library resources, commenting on the importance of author credentials, but these were fairly rare in this study.

Accuracy

Many students are notably devoted to locating numbers and facts, and attribute higher accuracy ratings to sources that have prominent graphs, statistics, or other sorts of numerical data, regardless of whether they are verified. They commonly pointed to this type of information as an indicator of credibility. "I saw the molecules and stuff, it just looks scientific," commented one student about their chosen source.[25] Another described being "actually really happy with this source because it just had so much information on it…like piles. It has all the details, circle graphs, line graphs…you see me like scrolling through it looking like, oh I could definitely use all this information for a research paper this would be perfect."[26] Interviewee Twenty-three commented, "It's good to have some of that background…either statistics or facts or surveys…something like that with some numbers…and actuals."[27] Another reflected on their chosen source, saying "I started reading different plot points and found that this is a really good site to go off of because it has facts and bulletins…I just thought it was a lot more reliable than the first one that I went to."[28] In a similar vein, a student described locating a "fact sheet about refugees, it is full of like citations of where they get their information so I'd probably at some point use that."[29] The commentary of students in this study about authority points to their heavy reliance on the appearance of factual data over a critical evaluation of the data they located in a search.

Meanwhile, among students who chose to search library databases to locate their sources, we found that many would seek out and select the "peer reviewed" journal filter as an indicator of accuracy. In those cases where the interviewer asked their reasoning about this choice, they could not generally explain it other than to note that they had been instructed to use peer reviewed journal articles for past coursework or assignments.

Purpose

This was the least referenced of all evaluation criteria. Where students paid attention to the purpose of a source, they frequently misidentified it. Most students struggled to identify online sources by type, and many were un-

clear on the differences between book, article, and other published sources. Students tended to select sources based upon length; for instance, they would express a preference for articles over books because they are shorter to read. Said one student, "I like articles best because they're more precise. That's the best information, well not best but like less to read…less reading to do for them."[30] They also consistently misunderstand the characteristics of sources that they are able to identify (e.g., books v. articles). One student noted, "articles are helpful because there's usually a lot more…thought and you know just kind of a personal perception."[31] Reflective of this common confusion, Interviewee Twenty-nine vacillated between book and article sources, saying at different moments, "I decided to go back to books 'cuz I didn't like the articles…articles seem too specific to me," and then later: "my thinking was well what kind of book am I going to get? That would be kind of lengthy on that subject…or more political."[32] Purpose effectively played no role in student information evaluation and served only as a confounding factor in their process.

DISCUSSION

Badging has proven effective in certain areas of library instruction, most notably helping community college students understand the purpose and value of a library. Students who hadn't completed our badges were less likely to have familiarity with library resources or to turn to the library for research. Badging allowed us to reduce the need for repetition in our in-class teaching sessions and workshops because many students now have a baseline of familiarity with the library's resources from which we can build. Students can also avoid repetition by showing their completed badges to instructors to demonstrate that they have already completed that portion of our curriculum, rather than needing to repeat the modules for the various classes that require them.

On the other hand, both quantitative and qualitative data point to the complexity of teaching students how to evaluate sources, particularly in an asynchronous, badging environment. Once we had tabulated our rubric data, we found that based on average rubric scores, there was no significant difference between badging and non-badging students in their ability to evaluate information and resources. Students who had completed the badges were equally troubled by how exactly to evaluate and interpret the kinds of information they encountered, regardless of whether they found it through a web browser or through the library's databases. Many students, both badgers and non-badgers, had learned or heard of the CRAAP test and attempted to use it for evaluation. But while students retained basic concepts from the CRAAP test and related instruction, they consistently misunderstood and misapplied it. Since a major impetus for this project was evaluating the efficacy of our badges, we determined that our badge focused on evaluation, "Website Crusher," was not effectively conveying that lesson and needed an overhaul.

From tagging our qualitative data, we also concluded that nothing in most library instruction related to evaluation asks students to acknowledge their own bias before they evaluate a source. We frequently noted that students created their own "like/dislike" criteria as a method for evaluating and selecting information, selecting sources that aligned with their personal beliefs rather than those that provided new information about their topic. We realized that in our badging modules we had not given students the tools to address their own biases nor the biases of the sources they found, so we determined that this should also be added to our badge curriculum.

Our findings reinforced what librarians and instructional designers at other institutions have found. The 2013 article "Teaching Web Evaluation: A Cognitive Development Approach" by Benjes-Small *et al.* particularly influenced our search for evaluation models that did not follow a checklist approach.[33] This article identifies two main problems with the checklist method. First, students often exhibited dualistic thinking despite the instruction's encouragement of more nuanced and critical thinking. Second, there was substantial overlap between the facets or evaluative criteria of most models, at least as they are encountered on the open web instead of the more tightly-controlled publication formats common in scholarly publications and academic journals. We also were inspired by M. Caulfield's 2017 *Web Literacy for Student Fact-Checkers*, which suggests four main moves and the habit of continually checking in with your own emotions.[34] This shift toward moves and behaviors emphasizes instruction based around practice rather than outcomes. It also puts students in a position to acknowledge their own biases as they evaluate information, a practice long advocated by fields such as composition and media studies. Acknowledging one's own biases has been incorporated into other recent toolkits such as the Stanford

History Group's Civic Online Reasoning and Stony Brook University School of Journalism's Center for News Literacy[35]. These pedagogical shifts toward practices and self-awareness align nicely with the "flipped" model. This model allows librarians to better model and articulate their evaluative behaviors, rather than merely provide students with a rationale that is inevitably informed by the added expertise and familiarity that librarians have with academic evidence and scholarly communication genres.

When M. Caulfield distilled these "four moves and a habit" into the SIFT Moves in early 2019, it was our assessment that adopting this acronym would be an effective replacement for the CRAAP model.[36] Swapping one acronym for another wouldn't require as much convincing and change on the part of faculty as would lobbying for multiple library instruction sessions per course or deeper integration into course assignments. Furthermore, the reorientation toward evaluative practices over the products of evaluation promised increased student evaluative performance.

CONCLUSION

Since adopting the SIFT moves, we've heard enthusiastic responses from faculty members, including those outside of the main three General Education courses targeted by our "Research Basics" badge set: a first-semester experience course, a Communications course, and an English composition course. Faculty across many disciplines now assign the badges and incentivize their completion by awarding a small amount of homework or participation points. Faculty from these disciplines have shared that they appreciate knowing that the badges allow students to learn the basics of our library at their own pace outside of the classroom visit. These are often students who are still building their computer skills or English language learners who are still developing their fluency with academic English. It's also common for students to "cherry pick" courses from a community college, taking one or two mid-level courses in order to transfer those credits to a different institution. Prior to implementing our "Research Basics" badges, these students would have missed the foundational library instruction provided in three main General Education courses. These students would have been left adrift during a library instruction session or would have necessitated on the spot "catch-up" guidance that would have been unproductively redundant for the majority of students in that class. Faculty who teach the three main General Education courses with which we'd previously used the CRAAP model have been particularly supportive about the switch to the SIFT moves.

Overall we have found badging to be an effective way of getting foundational library instruction to our students, especially in the dispersed campus environment of our community college. Instructors have been more eager to integrate it into their curriculum and it has provided us with the opportunity to have more focused in-person library instruction sessions than we did before the badges. It has provided students across the college with a foundation we can build upon when we talk to them about research and using library resources. However, it is not a perfect system, and like any form of instruction, regular assessment and reevaluation are needed in order to make sure that students are getting the information we intend. We will continue to regularly assess our badges and how they are or are not meeting our students' needs.

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