Online Searching Skills: Development of an Inventory to Assess Self-Efficacy

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August 16, 2004

Final revised version of paper published in *Journal of Academic Librarianship* 31, no.2 (2005): 98-105.

ABSTRACT

An instrument measuring online searching self-efficacy beliefs was developed. Several hypotheses related to self-efficacy and performance on assignments were tested. Students' efficacy beliefs rose significantly after an online course, and were related to good performance on assignments. The instrument may be used to measure changes in student attitudes after instruction.

INTRODUCTION

The focus of this study was to develop and validate an inventory to examine undergraduate students' self-efficacy beliefs regarding their online searching skills. The inventory might be used by instructors to assess student confidence levels with regard to various online searching tasks and could also be used to determine whether instruction increased confidence.

Our study was conducted in an online credit course, where grades serve as performance measures. However, the authors were interested in understanding if this instruction might affect not only students' course performance, but also their perception of their own skills. Do students' self-perceptions reflect the more objective evaluation of their performance? To understand this, we decided to look at student self-efficacy as another assessment measure.

Why does self-perception, as measured through self-efficacy, matter? Self-efficacy can be described as a person's belief in him or herself to successfully perform a task.[1] For the purpose of readability, the terms self-efficacy and confidence have been interchanged throughout this study. However, "[i]t should be noted that the construct of self-efficacy differs from the colloquial term 'confidence.' Confidence is a nondescript term that refers to strength of belief

but does not necessarily specify what the certainty is about. I can be supremely confident that I will fail at an endeavor. Perceived self-efficacy refers to belief in one's agentive capabilities, that one can produce given levels of attainment."[2] Use of the word confidence throughout this study reflects a general tendency in library studies to blur the lines between self-efficacy and confidence. However, use of the term "confidence" here signifies the more specific meaning of "agentive capabilities."

The tasks measured can vary in specificity and type. It has been shown that those with high self-efficacy toward a task are more interested in what they do, are more persistent when facing setbacks, work harder, and perform better on these tasks.[3] Thus, self-efficacy can provide an indication not only of how a student performs a task required for a course, but how that student is likely to continue to handle such tasks in future settings. Because self-efficacy has been proven to be an important indicator of student performance and success, the higher confidence a student has when completing a series of searching tasks, the more persistence and hard work we can expect that the student will employ when facing a new task.

Our goals for this study were:

(1) To develop and validate an instrument to gauge self-efficacy related to online searching.

(2) To assess the level of self-efficacy for various searching tasks before and after instruction. With regard to this goal, the authors hypothesized that:

- Student self-efficacy scores will be significantly higher after instruction.

(3) To study the relationship between self-efficacy and performance with regard to online searching tasks. We proposed two hypotheses:

- More confident students will perform better on course assignments.
- Good performance on assignments will increase confidence.

In order to test these hypotheses, students completed the inventory twice: before course instruction began and after they finished all course assignments.

LITERATURE REVIEW

To understand how self-efficacy affects actual searching, we did find that information retrieval failure is linked to low self-efficacy.[4] Additionally, those who report mid to high self-efficacy engage in more search strategies (show persistence).[5] And finally there is a relationship of frequency of use of an information resource and self-efficacy.[6] Thus, the more often someone uses a resource, the higher his or her self-efficacy in using it. And as a corollary, the higher self-efficacy a person has in using an information resource, the more likely they are to use it.

In looking for a valid scale for measuring search skills, we found a variety of computer and online skills scales developed and validated to assess self-efficacy. There are two instruments called "Internet Self-Efficacy Scale." The scale developed by Eastin and LaRose focuses on hardware and software skills, and the only search related question is very general ("I feel confident using the Internet to gather data.").[7] This study does show, however, that prior Internet experience was the greatest predictor of self-efficacy. The other scale with this same name measures self-efficacy of surfing, browsing and "finding information" on the Web; email tasks; and faxing, scanning, downloading, and creating a homepage. Again, the question of finding information on the Web is very general.[8] Similarly, the "Computer Self-Efficacy Scale" focuses

on issues of hardware, software, programming, and terminology.[9] None of the questions relate to search skills. And finally, the "Online Technologies Self-efficacy Scale" measures self-efficacy in computer-mediated communication such as e-mail, bulletin boards, newsgroups, and computer conferencing.[10] None of the questions in this scale relate to searching either. Thus, there is no scale available that enumerates specific tasks related to searching, and none that makes use of the Association of College and Research Libraries (ACRL) Information Literacy Standards or performance outcomes related to search skills.

Psychologists also caution that assessment of self-efficacy beliefs should reflect theoretical guidelines regarding the nature of task specificity of self-efficacy beliefs.[11] That is, items assessing self-efficacy beliefs should correspond to critical tasks being specified and taught. Assessing generalized or non-particularized self-efficacy beliefs (such as "I can search the Web") would result in decreasing accuracy of prediction and association between reported self-efficacy beliefs and performance outcomes. Thus, it is necessary to develop an inventory consisting of items that correspond to specific online searching skills.

The question of how library/research instruction affects self-efficacy also has some interesting answers in the literature. Beile shows that there is a strong correlation between self-efficacy and actual "library skills" and that instruction affects both positively. In this study, self-efficacy correlated to actual performance of skills completed pre-instruction and both skills and self-efficacy rose post-instruction.[12] What is also useful in her study is that the method of instruction (online vs. in person) did not affect the cognitive skills students achieved. It notes that distance students showed higher self-efficacy levels when their instruction was Web-based, (as in our

case). However, the skills were not defined, nor was the scale validated. Similarly, Ren asserts that self-efficacy can be enhanced through research skills instruction with hands-on practice. "This study shows that college students' self-efficacy in electronic information searching was significantly higher after library instruction, which combined lecture, demonstration, hands-on practice" (Ren 2000, 327).[13] This study also correlates frequency of use of library electronic databases with both pre- and post-training self-efficacy, indicating that hands-on practice in instruction is an important component.

Other studies provide insights into pedagogical issues that enhance instruction and searching self-efficacy. Affective instruction focuses on providing learners with motivating, confidence-building and positive language. A study which focused more on the method of instruction shows that "novice searchers who read affectively elaborated instructions were significantly better in Boolean comprehension, in writing well-formed Boolean search statements, in their confidence of accuracy, in how positively they rate the instructions, and in self-efficacy perceptions."[14] Another study indicates that self-monitoring of affective efficacy aids in success.[15] Thus instruction that can help students become more aware of their attitudes would also be beneficial.

METHODOLOGY

Development of the Inventory

One purpose of this project was to develop a valid instrument to measure student self-efficacy in relation to online searching. Bandura notes "Scales of perceived self-efficacy must be tailored to the target behaviors within the particular domains of functioning that are the object of interest."[16] Since other instruments reviewed during our literature search seemed to target confidence using

particular information sources, such as the library catalog, periodical databases, and the Web,[17] or a wide range of behaviors related to using the Internet,[18] the authors decided to focus exclusively on searching skills, rather than tools, and the specific target behaviors of this domain.

Most students have had some experience using a Web search engine, regardless of their exposure to research skills instruction. Collective wisdom holds that these students are confident, if not over-confident, about their ability to find the information they need using search engines. We were interested in measuring the confidence level of students enrolled in our online courses with regard to specific searching-related tasks, both before and after instruction. The first step in this process involved selecting tasks to use as the basis for items in the instrument. Because the ACRL Information Literacy Standards directly address this topic, the authors used them as a jumping-off point for item development.

ACRL Information Literacy Standard Two directly addresses searching skills: "The information literate student accesses needed information effectively and efficiently." The second performance indicator for this Standard states "The information literate student constructs and implements effectively-designed search strategies." Specific outcomes related to this indicator were selected as the basis for item development.

- 2B: Identifies keywords, synonyms and related terms.
- 2C: Selects controlled vocabulary.

- 2D: Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g. keywords, Boolean operators, truncation, proximity, field searching).
- 2E: Implements the search strategy in various information retrieval systems (e.g. uses Help screens, narrows or broadens search).[19]

The undergraduate students participating in this study were enrolled in a one-credit online research skills course taught by the authors. Instructional content for this course consists primarily of online tutorials developed by one of us, along with a variety of exercises to provide practice in skill development, and multiple-choice tests for assessment. The course uses the WebCT course management system. As the authors developed specific items related to the outcomes of Standard Two, we mapped the searching-related tasks described in our items to online course content, to insure that an adequate amount of instruction was provided during the course for each one. Thus the measure of confidence taken after instruction would relate to significant exposure to instruction and practice during respondents' participation in the online course.

The initial inventory consisted of 17 items related to the outcomes described above. Respondents were asked to select a number on a Likert scale between 0 (cannot do at all) and 10 (certain can do) for each item. Because some items included searching-related jargon that students might not have encountered before instruction (words such as thesaurus, Boolean, proximity, truncation), we included an option for students to mark any items that they did not

understand, in order to forestall guessing and provide information on items to be revised or eliminated from the final instrument.

Testing and Revision of the Instrument

After developing the instrument, we needed to confirm that each item measures some part of the common domain (online searching) and that it captures a unique aspect of searching self-efficacy that is not addressed by any other item. In order to determine whether individual items in our questionnaire are measuring a common domain, correlational analysis techniques were applied to data from student responses to the inventory, which was piloted during Spring 2003 in a one credit online course.

One hundred five students were enrolled in the course during this period. To encourage voluntary student participation, extra credit points were offered to those who completed the inventory both before the course began and after the course ended. Responses were reviewed in order to confirm that the initial inventory, which was presented as an online (Web-based) form, was actually completed before the student began to participate in the course. Similarly, we reviewed data to insure that the final inventory was completed after the student finished course assignments. Ninety-two sets of valid responses were submitted during Spring 2003. These responses were statistically analyzed, using correlational analysis, to determine content validity. Additionally, we examined those items that were marked by students as not understood, to determine whether we could rephrase the item or add an example to help clarify meaning.

The correlational analysis of Spring 2003 data resulted in the elimination of three out of seventeen questions. The three items were not correlated with the other items. Several other items, which seemed to overlap in meaning, were combined to produce a smaller set of twelve items. The authors also examined items that had a high number of "Do not understand" responses and rephrased them. For example:

Initial item: I can use truncation symbols (e.g. *, $) when searching in a database.

Revised item: I can use truncation symbols (e.g. *, $) to find variants of search words (e.g. teach, teacher, teaching) when searching in a database.

Table 1 shows the twelve items in the final version of the inventory,[20] in the order presented, along with the specific ACRL Information Literacy Standard Two outcomes that they address:

TABLE 1: Online Searching Skills Inventory items and outcomes addressed

Item	Item Text	ACRL Outcome
1	I can identify the most appropriate keywords or phrases for the information needed when I search a topic.	2B Identify keywords
2	I can identify alternate terminology, such as synonyms and broader or narrower terms, for the information needed.	2B Identify keywords
3	I can use a thesaurus in a database to select subject terms for searching.	2C Use controlled vocabulary
4	I can construct a search using Boolean operators (e.g. AND, OR, NOT).	2D Construct search
5	I can use a particular search field (e.g. title, URL, author) when searching for specific information.	2D Construct search
6	I can construct a keyword search so that my search words are found near each other, within the same paragraph of a document.	2D Construct search
7	I can construct a search to retrieve documents containing an exact phrase.	2D Construct search
8	I can construct a complex search using more than one Boolean operator and grouping terms together using parentheses.	2D Construct search
9	I can use truncation symbols (e.g. *, $) to find variants of search words (e.g. teach, teacher, teaching) when searching in a database.	2D Construct search
10	When subject terms relevant to a topic are shown in a database, I can search for additional information using those subject terms.	2C Use controlled vocabulary
11	I can determine when browsing in a database will be more effective than entering search terms.	2E Implement strategy
12	I can narrow or broaden my search to retrieve the appropriate quantity of information.	2E Implement strategy

Data Collection

The revised 12-item scale was used in the second phase of this study. Students enrolled in the Autumn 2003 section of the online course were again offered the opportunity to participate before and after instruction. Course enrollment for this period was 125.

A high percentage of students elected to complete the inventory. One hundred eight sets of valid responses were received and checked, to determine that they were completed in the appropriate timeframe. A variety of statistical tests were performed on the Autumn 2003 inventory results. This analysis also incorporated several types of student performance data (average score for searching-related course assignments as well as cumulative point total earned in the course), in an attempt to correlate any improvement in confidence to performance. Student academic rank (first-year, sophomore, etc.) and college of enrollment for respondents is profiled in Table 2.

TABLE 2: Profile of respondents (*n*=108)

Student Academic Rank	
1 (First-year)	51 %
2 (Sophomore)	14 %
3 (Junior)	15 %
4 (Senior)	20 %
College of Enrollment	
Arts & Sciences	30 %
Business	18 %
Others	25 %
Undecided	27 %

RESULTS

Table 3 presents the means (M) and standard deviations (SD) for the revised 12 items of the self-efficacy inventory from the pre- and post-administrations. These values are based on only those participants completing all items for both administrations (n = 108).

TABLE 3: Means (*M*) and standard deviations (*SD*) of the 12 items of the instrument completed by students (*n*=108)

ITEM	1	2	3	4	5	6	7	8	9	10	11	12
Pre-test												
M	7.29	6.75	6.55	5.53	6.95	5.87	6.45	4.80	3.92	5.86	5.38	6.31
SD	2.11	1.92	2.82	2.65	2.54	2.52	2.64	2.43	2.65	2.40	2.31	2.59
Post-test												
M	8.53	8.48	8.36	8.96	8.81	8.78	8.93	8.67	7.77	8.44	8.16	8.59
SD	1.57	1.42	1.58	1.42	1.35	1.38	1.43	1.63	1.72	1.57	1.62	1.52

Instrument Validity

Exploratory factor analysis is a technique often used to detect and assess latent sources of variation and covariation in observed measurements. It is widely recognized that exploratory factor analysis can be quite useful in the early stages of experimentation or test development. This statistical technique (1) indicates whether there exists a smaller number of underlying common factors, and (2) identifies the relationship between individual items and the common factors uncovered. Thus, from this analysis, we can determine if the instrument measures one underlying common factor, self-efficacy or confidence in online searching, rather than multiple factors. We can also identify which items in the instrument are not measuring any aspect of our domain and exclude them from the instrument.

An exploratory factor analysis technique was used with principle axis factoring to examine the number of dimensions underlying the revised 12-item efficacy inventory. Separate analyses were conducted for the pre- and post-administrations of the inventory. The Kaiser–Guttman rule[21], a scree plot,[22] and the percent of the variance explained in the efficacy beliefs were examined to determine the number of dimensions of the 12-item inventory. Specifically, according to the Kaiser–Guttman rule, the dimensions or factors with eigenvalues greater then one were retained. This rule, however, tends to overextract the number of dimensions.[23] Thus, we also examined a scree plot for the extracted factors. The dimensions or factors above a clear break in the plot were retained. Finally, we examined what percentage of the variance for the inventory was accounted for by retained factors. The percentage of the variance should be substantially large, at least 50%.[24]

Pre-administered inventory. From the results of the exploratory factor analysis, two factors had eigenvalues greater than one, 6.82 and 1.12, respectively. On the other hand, the scree plot had a clear break between the first factor and the second factor. In addition, the first factor explained about 53% while the second factor explained only 7% of the variance. Based on these results, we performed a factor analysis again, extracting only one factor. The resulting factor had items with high factor loadings. As seen in Table 4, the loading of the 12 items ranged from 0.67 to 0.83. Therefore, it appeared that a one-factor analysis was representative of the 12-item inventory.

Post-administered inventory. Results of the exploratory factor analysis for the 12 items revealed a one-factor structure of the inventory, as they did for the pre-administered inventory. A single factor had an eigenvalue greater than one. In addition, a scree plot for the post-administered

inventory also showed a clear break between the first and the second factor. The extracted factor explained about 67% of the variance in the students' responses. Factor loadings of the 12 items on the factor were also very high ranging from 0.67 to 0.87 (See Table 4).

Based on the results of the factor analysis for the pre- and the post-administrations of the inventory, it appears that this 12-item inventory was uni-dimensional. Thus, the inventory was intended to assess overall students' beliefs about online searching skills, as represented by ACRL Information Literacy Standard Two, which addresses students' abilities to construct and implement effectively-designed search strategies.

TABLE 4: Factor loadings of the 12 items for the pre- and the post-administered inventory

Item	*Pre*-test	*Post*-test
1	.70	.81
2	.73	.84
3	.67	.79
4	.73	.86
5	.73	.83
6	.70	.80
7	.67	.83
8	.71	.87
9	.69	.67
10	.80	.85
11	.78	.78
12	.83	.87
Eigenvalues	6.82	8.35
Percentage of variance	53.02%	66.87%

Note. Extraction method was Principle Axis Factoring.

Instrument Reliability

The examination of the psychometric property of an inventory also requires an analysis of reliability. In this study, we assessed internal consistency and stability of the inventory. Internal consistency is the degree to which overall students' responses to items are consistent within a single administration of the inventory. To evaluate internal consistency, Chronbach alpha was estimated for the pre- and the post-administrations, respectively. Stability of the inventory addresses the consistency of students' responses to the inventory over the time. Test-retest

reliability coefficients were calculated from students' responses to the inventory across the pre- and the post-administrations.

Chronbach alpha for the inventory at the pre- and the post-administrations were 0.93 and 0.96, respectively. When using this measure, results that are closest to 1.0 have a higher estimate of reliability. Test-retest reliability coefficients for the inventory were .38. Thus, overall, the inventory was found to be highly reliable.

Relationship of the Pre- and Post-Administrations of the Inventory

It was predicted that scores for the inventory administered at the beginning of the course would be significantly different from scores at the end of the course. Specifically, students' self-efficacy beliefs for online searching assessed by the inventory were hypothesized to increase after the course. To examine this hypothesis, we performed dependent t-tests to compare mean scores for the inventory across the pre- and the post-administration. Results showed that, overall, the reported self-efficacy beliefs assessed at the end of the course (the mean score was 8.54) was significantly higher than those at the beginning of the course (5.97), $t(107)=11.78$, $p<.001$. The item-by-item analysis showed that each of scores for the 12 items significantly increased during the course. As Table 5 indicates, the increase of students' responses to Item 4, 6, 8, 9, 10, and 11, was greater than 2.5 points (25%) on a ten-point scale**.** Even the least increase (Item 1) was greater than one point (10%).

TABLE 5: Hierarchically ordered searching tasks and changes in self-efficacy (*n*=108)

Item	Text	Mean *Pre*-test	Mean *Post*-test	Increase	Dependent -*t*
8	I can construct a complex search using more than one Boolean operator and grouping terms together using parentheses.	4.80	8.67	3.87	14.14*
9	I can use truncation symbols (e.g. *, $) to find variants of search words (e.g. teach, teacher, teaching) when searching in a database.	3.92	7.77	3.85	14.20*
4	I can construct a search using Boolean operators (e.g. AND, OR, NOT).	5.53	8.96	3.44	12.17*
6	I can construct a keyword search so that my search words are found near each other, within the same paragraph of a document.	5.87	8.78	2.91	12.00*
11	I can determine when browsing in a database will be more effective than entering search terms.	5.38	8.16	2.78	12.65*
10	When subject terms relevant to a topic are shown in a database, I can search for additional information using those subject terms.	5.86	8.44	2.58	10.87*
7	I can construct a search to retrieve documents containing an exact phrase.	6.45	8.93	2.47	9.68*
12	I can narrow or broaden my search to retrieve the appropriate quantity of information.	6.31	8.59	2.29	9.02*
5	I can use a particular search field (e.g. title, URL, author) when searching for specific information.	6.95	8.81	1.86	7.58*
3	I can use a thesaurus in a database to select subject terms for searching.	6.55	8.36	1.81	7.53*
2	I can identify alternate terminology, such as synonyms and broader or narrower terms, for the information needed.	6.75	8.48	1.73	9.90*
1	I can identify the most appropriate keywords or phrases for the information needed when I search a topic.	7.29	8.54	1.25	6.12*
Composed score		5.97	8.54	2.57	14.73*

*Dependent-*T* score is significant at the .001 level

Relationship of Self-Efficacy to Performance

We predicted that students' responses to the inventory would relate to their performance during the course. As shown in Table 6, students' responses to the inventory assessed at the beginning of the course did not associate with either their scores on assignments specifically designed to develop online searching skills or their cumulative point total for all course assignments. That is, those students whose confidence levels were highest on the initial inventory did not necessarily perform better on course assignments. On the other hand, our hypothesis that good performance on assignments will increase confidence was supported by the data. Students' efficacy beliefs assessed at the end of the course were significantly related to both scores for the specific assignments (r = .24, p<.05) and the point total for all assignments (r = .32, p<.05).

TABLE 6: Means (*M*), standard deviations (*SD*), and correlation coefficients between self-efficacy and performance data (*n*=108)

	1. Mean efficacy beliefs (pre-test)	2. Mean efficacy beliefs (post-test)	3. Searching-related course assignments	4. Course cumulative point total
1		.38*	.12	.05
2			.24*	.32*
3				.56*
M	5.97	8.54	47.19	175.18
SD	1.86	1.26	3.91	20.60

* Correlation is significant at the .05 level

DISCUSSION

Study Findings

Because this study did not implement an experimental method, we cannot conclude that a causal relationship exists between the instruction provided in this course and the increase of the levels of students' efficacy beliefs. However, it appears that mastery experiences during the course had an impact on the increased levels of students' confidence in their online searching skills.

The instrument that was developed has been determined to be both valid and reliable for assessing self-efficacy beliefs related to online searching skills, based on factor analysis and reliability tests. Students reported increased confidence regarding searching tasks after instruction in a four-week online course that included a significant searching skills component, with repeated opportunities for students to practice searching tasks and receive feedback on their progress. Because of the intensive nature of instruction provided over a long period to participants in this study, we cannot infer that instructional contacts of lesser duration (such as lectures, single course assignments, online tutorials, or workshops) would produce similar results.

Student response on six items in the inventory changed by 2.5 or more points (25%). Item 9 (using truncation symbols), the item with the lowest initial mean confidence level of 3.92, increased by 3.85 points to a mean score of 7.77 (out of 10). Item 8 (complex search using Boolean operators and parentheses) showed a similarly dramatic increase, from a mean of 4.80 to a final mean of 8.67. We might conclude that most students in this course had never been

exposed to instruction on these particular search skills, and that the instruction provided in the course was effective in helping students to believe they could perform these tasks. As Table 5 indicates, four other search-related tasks with initial mean scores between 5 and 6 also increased by at least 2.5 points: using Boolean operators, constructing keyword searches to find words near each other, determining when browsing is the most effective search strategy, and using subject terms in database records to extend searches. Students initially felt more confident about tasks involving identifying search terminology, using a thesaurus to select subject terms, searching in particular fields, narrowing or broadening a search, and searching for phrases.

One hypothesis about the relationship between confidence and performance was supported: good performance on course activities did help to increase student confidence (as demonstrated by post-course inventory scores). Another hypothesis, which predicted that more confident students, as demonstrated by pre-course inventory scores, would perform better on relevant course assignments, was not supported by the data in this study. Apparently the higher confidence levels before instruction of some students are not based on real knowledge of the searching related tasks, but rather reflect overconfidence in their abilities. Ren also notes a lack of correlation between pre-training self-efficacy and performance on assignments, suggesting, "Students might feel self-efficacious without having the necessary skills for electronic searching. Perhaps the initial self-efficacy was derived from a general sense of self-confidence but not grounded on the performance of specific tasks."[25] Other researchers confirm the notion that, with regard to assessing their own knowledge levels, "the most common overall effect is a marked tendency to overconfidence" (Fischhoff and MacGregor 1986, 222).[26]

Use of the Instrument

The authors believe that the instrument developed in this study is most appropriately used to look at *changes* in student attitudes after instruction. Because of the tendency to overestimate skill levels and knowledge, the instrument would not be useful if administered only before instruction in order to determine which searching skills to address. In this context, the results would likely be misleading.

By assessing student confidence before and after instruction, one may gain some insight into the affective dimension of learning, an important and often overlooked aspect of instruction. Rose and Meyer believe that affective issues, although essential to facilitate learning, are often given the least formal emphasis in the curriculum. "When students withdraw their effort and engagement, it is tempting to consider this a problem outside the core enterprise of teaching."[27] They also state "The emotional valence of an academic task is critical in determining how well a student will succeed at it – or even how much effort he or she will invest."[28]

Nahl reflects this notion of the interrelationship of affect and persistence. She reports that one third of a group with significantly lower scores on a self-efficacy measure dropped the course in which it was given within the first three weeks of the grading period. She also states "this finding replicates other studies showing that self-efficacy must reach a critical level before learning can be successful."[29] The authors hope that the Online Searching Skills Inventory will be useful to instructors who wish to determine whether self-efficacy beliefs related to that domain are changing in a positive manner.

Further Research

Does self-efficacy have any real impact on future performance after the initial instructional experience? A future study might examine how well students who express high confidence in their searching abilities after completing a college-level course that focuses on searching skills can perform search-related tasks in subsequent instruction, such as a second course. We have collected some data related to subsequent course performance and hope to present it in a later case study.

Are there differences in self-efficacy of online searching skills related to different types of instruction? As indicated earlier, this scale has been validated to measure self-efficacy within course-level instruction. Other researchers might use this scale to measure changes in self-efficacy in a variety of course-length teaching scenarios such as online, in-person, with varying levels of practice assignments, with varying levels of affective instruction, etc. Use of a consistent measure such as this should provide more precise insights into how different teaching methods affect student self-efficacy.

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