Assessing Affective Learning Using a Student Response System

Emily Rimland

Abstract: Affective learning relates to students’ attitudes, emotions, and feelings. This study focuses on measuring affective learning during library instruction by using a student response system. Participants were undergraduate students who received course-related library instruction for a research assignment. Students rated their confidence levels associated with finding resources before and after the library session using a student response system and again at the end of the semester using a paper survey. The results show a significant improvement in confidence levels for students receiving library instruction, suggesting that library instruction can have a positive influence on affective learning.

Introduction

This study focuses on using a student response system for measuring learning in the classroom, specifically affective learning during library instruction. Affective learning relates to students’ attitudes, emotions, and feelings. Becoming aware of the affective domain can increase learning, even influencing cognitive learning. This study examines students’ affective learning by measuring their confidence in being able to find resources for an assignment. Participants in the study were undergraduate students at Penn State who received course-related library instruction for a research assignment. Students were asked to rate their confidence levels in finding resources before and after the library session using a response system and again at the end of the semester using a paper survey. The results show a significant increase in the average number of students who rated themselves as “very confident” by the end of the instruction session, and a corresponding significant decrease in the average number of students who rated themselves in the “uncertain” category post-instruction. However, the study did not control for first-year students who may have become more confident at the end of the semester simply by virtue of acclimating to college in general.

Copyright © 2013 by The Johns Hopkins University Press, Baltimore, MD 21218.
Purpose

Affective learning is often contrasted with cognitive learning, which is associated with synthesis, evaluation, and comprehension of knowledge or information. Affective learning has gained momentum as a topic of continuing study and discussion in the literature and therefore provides a test bed of measurement in and of itself, but also for new assessment tools like student response systems. Student response systems, commonly known as “clickers,” made their debut in the classroom in the late 1990s as a way to assess students’ understanding of the subject matter and provide immediate feedback to instructors. The next generation of clickers, often referred to as open-ended response systems (OERS), offer new opportunities that extend the use of clickers. OERS couple backchannel-like technology, popular in social media tools, with the option to use devices students already own, like mobile phones, laptops, or tablets. An OERS was chosen for this study, in part because an OERS not only allows, but elegantly encourages input from a variety of devices. Depending on circumstances, these new ways of inputting feedback obviate the need for students and instructors to worry about an extra device like a clicker, since a large majority of students have access to either text-messaging, a tablet, a laptop, or a desktop computer in class. Therefore, an OERS presents an opportunity to easily and quickly measure a variety of learning aspects during instruction, including affective learning.

This study measured the confidence levels of students before and after library instruction using an OERS, and again at the end of the semester using a paper survey. The outcomes of the responses were deeply analyzed in order to accurately measure student affective learning following library instruction and how affective learning may impact teaching and the student research process.

Literature Review

Why Assess the Affective Domain?

The affective domain is important to examine because, as Ramona Hall states, “the cognitive and affective domains are inseparable.” Proper assessment of the affective domain is as vital to increasing learning as assessment of the cognitive domain. In fact, assessment of the affective domain may at times be more important than the cognitive, because it can help an instructor intervene with students who tend to “give up on themselves” in the classroom. This seems especially true when dealing with students who may be facing library anxiety, a well-documented fear experienced by many users in an academic library. As Anthony Onwuegbuzie found, library anxiety can threaten students’ ability to complete a task successfully.

Additionally, self-awareness of feelings, emotions, and attitudes toward the research process can lead to enhanced student learning. Carol Kuhlthau believes that students...
need to evaluate their work in order to reflect on their struggles and make changes for future tasks, saying they “need to become aware of their feelings at the end of the library research process [because their] feelings are often an indication of how successful they have been in meeting the requirements of the research assignment."8 Once aware of their feelings, students are more likely to make changes that lead to success in the classroom.

Another advantage to assessing the affective domain relates to instructors. With feedback in hand, an instructor can change the lesson plan based on the needs of the students. Hence, the affective domain must be assessed periodically during instruction in order to monitor changes in the students and retool the lesson plan.9 However, as H.D. Black and W.B. Dockrell add, although teachers value this kind of information, they don’t often carry it out, at least in any formal way using an assessment tool. Rather, teachers tend to use observed behaviors as their means for informal assessment; however, this approach can be very time-intensive to summarize for an entire class and tends to ignore the silent majority of students who may be nonvocal or have unobservable behaviors. In terms of assessment, if instructors agree that it’s worth it, the authors argue, “then we must conclusively show that we can.”

Looking more closely at affective information literacy skills, many students have fear of the research process and are often intimidated by library search tools and resources. In addition, students may have little faith in their abilities to find information, or may lack the metacognitive awareness necessary to realistically assess their skills.11 In fact, novice library users report more negative affect than positive affect, according to Diane Nahl-Jakobovits and Leon Jakobovits.12 Focusing on affective learning and addressing these needs in a library instruction session can lead to more positive behaviors and productive results.13

**Challenges to Measuring Affective Learning**

Teachers don’t often conduct formal measurement of affective learning because of the barriers to overcome and affective characteristics are not easily measured. Affective traits are also readily influenced by a person’s mood or feelings, which fluctuate from day to day or even hour to hour. But the largest concern linked to measuring affective learning is research biases. As with other types of research, students may feel compelled to “please the teacher” with positive feedback and therefore not provide honest answers.14 Conversely, if the teacher or researcher poses some kind of threat or authority over the respondents, the students may not feel they can answer honestly, for fear that their answers could be traced back to them, and, for example, unfairly influence their grade.15 In addition, if the evaluation is too lengthy or difficult, students tend to not take it seriously.16

The literature is clear on measures to be taken to combat these challenges. Affective assessment must first be completely anonymous and students must know this up front.17 Taking some simple steps, like providing collection boxes for surveys, to ensure anonymity will go a long way in increasing the likelihood of honest answers. Additionally, instructors can increase the perceived validity of the evaluation by making it clear and simple, using Likert scales and clearly worded questions. Craig Mertler argues that taking such measures to carefully assess affective learning can ensure affective assessment is reliable.18
It’s also important to note a recent study by Melissa Gross and Don Latham, in which they found that first-year students have a tendency to overrate their information literacy skills when compared to their actual abilities. Such students also tend to not seek help because they feel it’s not needed. The authors warn that “competence among users cannot be assumed by educators or librarians even (or perhaps especially) when [users] self-identify as competent.” The good news is, as Kulthau pointed out, when students gain better skills, their ability to self-assess improves as well. This not only validates the need for the information literacy instruction, but also the assessment of affective learning paired with information literacy instruction as a way to mitigate the miscalibration of students’ competence.

**Methods and Designs for Assessing Affective Domain**

Despite the challenges, several methods are available for assessing the affective domain. Evaluating the affective domain numerous times over the course of several weeks using a mix of measurements will help account for the unreliability of students’ feelings. The instructor must also decide between group and individual responses to an assessment. This decision is largely based on the teacher’s role in the classroom. Hall advises that a group assessment is more useful for the purposes of revising instruction for a class and adds that group data helps to mitigate any dishonest data or fluctuation in mood from some individuals.

Surveys and questionnaires are very common tools for this type of assessment, but they are not the only techniques that can be employed specifically by librarians teaching course-related instruction who wish to measure affective learning. In two separate studies, Elizabeth Choinski and Michelle Emanuel, and Elizabeth King found the one-minute paper or essays to be useful; Robert Schroeder and Ellysa Cahoy suggest observations and reviewing computer search logs; and Kulthau focuses on measures using timelines, flow charts, summary statements, and conferences with the teacher. Onwuegbuzie cites at least nine ways to measure affect, including rating scales and Likert scales. King and Barbara Martin also provide a number of best practices for designing affective domain assessments, which should be reviewed prior to creating your own.

**Student Response Systems**

As far as student response systems are concerned, the literature until recently has focused on how the devices themselves were perceived by students. Mayer found that a clicker-supported questioning method did improve grades, however, the study focused completely on cognitive outcomes. Most research on the topic concludes that clickers have the potential to increase learning but stress that they alone do not increase it and need to be combined with other pedagogical strategies. Generally speaking, affective
learning assessment using a response system is not an area that has been explored.

The use of student response systems in library instruction has been the subject of quite a few research studies, which examine a variety of aspects related to student response systems, including retention of material, active learning, and engagement. Mirroring the general body of scholarly literature, many of the outcomes involving libraries seem to contradict one another, and, as Emily Dill notes, “It is often unclear, however, if these novel techniques for imparting library information and research skills have a positive effect on student learning and retention of the material.”

Reflecting on the advantages of using clickers and OERSs to measure affective constructs (for example, anonymity, ease of use, sample size), they would seem to be almost ideal tools. Sarah Gewirtz’s article discusses using Poll Everywhere to make library instruction interactive, and the ILI-L listserv archive contains messages by librarians using Poll Everywhere and clickers to assist with active learning or icebreakers. However, no literature was found to focus on any type of student response systems or the use of similar tools in libraries to measure the affective domain. Despite the rise in use of student response systems in college classrooms, the opportunity to use them to measure affective learning in library instruction has yet to be fully exploited.

Methods

Participants

The participants in this study consisted of undergraduate students at Penn State who received course-related library instruction at the request of their instructor during the Fall 2011 and Spring 2012 semesters. The average class size was 24 students and included a small variety of courses such as: CAS 100 (Effective Speech), ENGL 15 (Rhetoric and Composition), and FYS (First-year Seminar in Communication Arts and Sciences). The library sessions were all taught by the author and were tailored to the classes’ needs, based on an upcoming assignment and demonstrated use of the libraries’ catalog (LionSearch, that is, Summon) and a handful of databases selected by the librarian as being the best suited to the students’ assignments.

Based on an average class size of 24 students and not accounting for absences, 590 students potentially participated in the study, however, actual response rates can be found in Table 1. In retrospect, using actual class attendance, rather than average class size, would have allowed more accurate participation tracking that would likely have yielded a higher response rate.

The investigator obtained Internal Review Board (IRB) approval from the University’s Office of Research Protections prior to beginning the research study. Implied informed consent allows researchers to circumvent the requirement of obtaining signed consent forms and states that by taking part in the poll or survey, participants are giving

Despite the rise in use of student response systems in college classrooms, the opportunity to use them to measure affective learning in library instruction has yet to be fully exploited.
their consent to take part in the research. At the time of polling, the students were given
the option to participate voluntarily in the research study and were allowed to drop
out at any time. Participants were informed that answers to any polls were completely
confidential, anonymous, and voluntary.

**Instruments (Materials)**

The polling and surveying mechanisms for the fall 2011 and spring 2012 semester were
identical. The OERS tool Poll Everywhere was used twice during each instruction ses-
sion to solicit responses from students about the affective domain. It is suggested that
affective learning be measured several times to account for the capriciousness of the
affective domain, so the students were surveyed once at the beginning and once at the
end of the class. The literature recommends focusing on one affective trait at a time, so
the poll questions were designed to measure the single trait of students’ confidence
levels in finding sources for their assignment.  

As Poll Everywhere is an OERS, it offers respondents several modes of participation,
including text-messaging and embedded polls on websites. In Patricia Nordstrom and
Vicki Williams’ study, the researchers chose to limit the method of response to text mes-
saging, because the latest available data showed that 92 percent of Penn State students
owned cell phones, with 86 percent of those students using their phones for texting.28
While not allowing for a universal response, limiting the response mechanism in this
setting did have the benefit of keeping the instructions simple.

To ensure consistency of data and ease of analysis for the research study as mentioned
by King, a multiple choice format was chosen over free-text responses.29 The investiga-
tor created the pre- and post-class questions based on the best practices reviewed in the
literature. The pre- and post-class questions were essentially the same question, but had
a slight difference in wording in order for the researcher to tell the two questions apart
and prevent confusion. The polling questions used in the study were:

**Pre-class question:** Do you feel confident in your ability to find sources for this assignment?

**Post-class question:** Rate your confidence level related to finding sources for your
assignment.

For each question students had a Likert scale of response options to choose from:

Very Confident, Confident, Neutral, Uncertain, Very Uncertain. Students texted in their
response to a unique phone number provided via the Poll Everywhere web interface.

At the end of the semester, students who attended the library sessions that included
use of Poll Everywhere received print surveys with follow-up questions about the library
session and the use of polling. Students completed these surveys in class with the as-
sistance of the course instructor. The instructor then mailed the surveys to an assistant
who entered the data into a secure, online data storage tool called Select Survey. (See
Appendix A for copy of the paper survey.) Microsoft Excel and Minitab were used to
conduct a deeper analysis of the pre- and post-class responses.
Procedure

During the scheduled instruction sessions, students entered the library instruction room and seated themselves as per a usual instruction session. The investigator began the session with an introduction and then invited students to take out their cell phones, possibly the only sanctioned time to do so during a college class, in order to answer a question. The investigator informed the class that she was studying how students feel about the research process (affective domain) and their participation in the poll was both voluntary and anonymous. The investigator stressed that because the responses were anonymous, the students could answer honestly and that the feedback would help the investigator better understand the class’s attitudes toward the research process.

The poll questions were posed to the class by projecting the polleverywhere.com website containing the questions. The site provides an instruction screen with clear directions for participants to follow. At this time, the investigator gave the class thirty to sixty seconds to respond to the first poll. The Poll Everywhere site can show results in real-time as each person responds, or results can be revealed after all participants have responded. The investigator chose not to reveal the answers until the students finished responding, primarily because of the risk of biasing later responders. Once all participating students responded, the investigator revealed the response graph for the class and briefly discussed the results. Students were asked to put away their phones (until the penultimate minute of the class) and from this point on the remainder of the session was dedicated to finding resources to assist the class with their assignment.

After the investigator conducted the instruction session, the students were asked the post-class question and responded by text-message about their confidence. At this point in the instruction session the students have used the Libraries’ online catalog, a variety of databases, and specific websites all geared toward their assignment requirements. In many cases, students have found a few articles they can use and cite in their assignment. At the time the students were responding to the second poll, the investigator made a point to tell students that in some cases their confidence level may “backslide” into a more uncertain category. She informed the class that this is natural and is usually due to the realization that the topic needs to be refined or better articulated after conducting initial research. This step is important, as the literature notes, so that participants feel encouraged to respond honestly, and don’t feel they have to respond in such a way as to convince the instructor she’s done an adequate job teaching the class. It is also important in light of the research study conducted by Gross and Latham, which found that students tend to think higher of their abilities than is actually true. If students overestimated their confidence level in the pre-test, they are more likely to better realize this at the end of class, after they’ve learned some skills and had a chance to practice them. Therefore, they should be informed that “backsliding” is a normal occurrence.
The results of the post-class poll were collected by the system and displayed on the projector for the class. The researcher noted at this time how the responses compared to the pre-class poll, thanked the class for their participation, and concluded the library instruction session. Further analysis of the responses can be found in the Findings section below.

As the semester came to an end, the investigator emailed the course instructors for whom she had taught library sessions, and asked for their permission to conduct a final assessment of the students’ library experience. All instructors agreed to distribute paper surveys to their students and return them to the investigator’s departmental assistant. The paper surveys were anonymous, voluntary, and contained an implied informed consent statement. At Penn State, low-tech, in-class paper surveys have been found to have a higher completion rate than out-of-class web-based surveys, although not all instructors returned surveys in this study (see Table 1).

Data Collection and Analysis

The Poll Everywhere account used by the investigator offers response history features, including the option to export each poll to Microsoft Excel. This option was used to compile and conduct initial analysis of the data from the pre-class and post-class confidence level polls, as well as the end of semester surveys. Minitab software was used to conduct a normality check, the MANOVA (multivariate analysis of variance) method, and two sample t-tests to provide more analysis of the data resulting from the pre- and post-class polls.

After all sessions in the fall 2011 and spring 2012 were completed and paper surveys were returned, final data collection and analysis began. Because the paper surveys were not kept in groups in order to match them with the pre- and post-class polls for each session, they were unable to be included in the detailed analysis using Minitab, but were able to be analyzed independently. In future studies, the groupings should be maintained for more detailed analysis.

Findings

Table 1 summarizes the participation rates for all three assessment types used in this study. A small sample size is one concern mentioned in the literature related to challenges of measuring affective learning, however there was a fairly high rate of participation using these methods, in particular with the in-class polling.

The combined confidence levels for the polls conducted pre- and post-class are summarized in Figure 1 below. At a cursory glance, there does appear to be a general gain in confidence and a small increase in responses in the “Very Uncertain” category when comparing pre-class to post-class levels. Before concluding these initial impressions as true, a normality check, the MANOVA (multivariate analysis of variance) method, and two sample t-tests were used for a more robust analysis of the data. The analysis and tests showed that normality could be assumed for data collected in the pre- and post-class polls. The MANOVA method and t-tests also revealed that the categories of “confident” and “very uncertain” were not statistically significant in this research study. In other words, respondents who answered as either “confident” or “very uncertain” were not significantly impacted by the library instruction either positively or negatively.
However, the analysis did show there was significant change in the total numbers and average for the categories of “neutral,” “uncertain,” and “very confident” from pre-class to post-class. Because individual’s responses weren’t tracked from pre- to post-class, that is, responses were anonymous, it cannot be said for certain that the respondents shifted to a more positive confidence category. However, since analysis showed there was a significant change in the total numbers for those categories, this means the instruction impacted these students in some way.

Although individual students were not tracked in this study, the data was able to reveal other overall trends related to changes in confidence levels between the pre- and post-class polls in two areas of significance. First, there was a significant increase in the average number of students who rated themselves as “very confident” by the end of the instruction session. Second, a corresponding significant decrease was found in the average number of students who rated themselves in the “uncertain” category post-instruction. In other words, the “very confident” category had a significantly greater mean post-class, while at the same time the “uncertain” category was significantly smaller post-class. (see Figure 1) Additionally, since the “very uncertain” category was found to have no significant change in number of responses, it is likely that the “uncertain” students didn’t move down into the lower “very uncertain” category and therefore did have positive improvement. The “neutral” group was also found to have a significant mean decrease, however, it cannot be said if students in this category were positively or negatively impacted since individuals were not tracked.

It should be noted that the question on the paper survey was slightly different than the pre- and post-class polls, which could have impacted responses. However, the paper surveys can serve as a stand-alone source of how the students felt overall at the end of the semester after having more opportunities to conduct research, refine skills, or meet

Table 1.
Summarizes participation rates in the three assessment measures.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Pre-class participation rate</th>
<th>Post-class participation rate</th>
<th>% change in participation from pre- to post-class poll</th>
<th>End of semester survey participation rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2011</td>
<td>80.9%</td>
<td>62.5%</td>
<td>-27.9%</td>
<td>61.4%</td>
</tr>
<tr>
<td>Spring 2012</td>
<td>86.8%</td>
<td>65.2%</td>
<td>-24.8%</td>
<td>59.3%</td>
</tr>
<tr>
<td>Average Rate</td>
<td>83.9%</td>
<td>63.6%</td>
<td>-26.4%</td>
<td>60.2%</td>
</tr>
</tbody>
</table>

First, there was a significant increase in the average number of students who rated themselves as “very confident” by the end of the instruction session.
Figure 1. Comparison of pre- and post-class confidence level responses by percentage.

Figure 2. Students combined responses to the question at the end of the semester: *As the semester comes to an end, how satisfied do you feel about your ability to find and use appropriate sources for your assignments?*
with a librarian or instructor. There does appear to be a slight increase in confidence levels at the end of the semester compared to the post-class polls but without checking this assumption for normality and variance, it cannot be concluded that it is a significant change. (See Figure 2)

The time involved in affective assessment by both students and instructor are mentioned in the literature as a barrier to conducting this type of assessment. Based on the total time (pre- and post-class combined) of approximately five minutes of class time, it is hard to imagine many other types of assessment that would involve less time.

Discussion

Because an increased average number of students responded in the “very confident” category, and a corresponding decrease in the average number responded in the “uncertain” category post-class, the evidence strongly suggests that the session had a positive influence on affective learning with regard to the trait of confidence. These results may not be shocking to librarians, who may have already perceived this to be the case anecdotally, however, through analysis according to this methodology, the research shows this to indeed be true.

This study had a fairly large sample size and a good response rate, but certain limitations should be mentioned. Factors such as students’ class standing and previous information literacy experiences could play important roles in their affective learning and may have an impact on responses. Although the courses sampled in this study tended to be introductory general education courses, such as Rhetoric and Composition and Effective Speech, upper-division students are not excluded from enrolling in these courses at Penn State. Upper-division students should be somewhat more confident in their ability to do research, since they have likely had other research-based assignments by this time. The fact that some students are taking introductory classes as upper-division students may suggest that they lack the confidence or skills (including information literacy skills) to do the course assignments. This is a known trend especially for the Effective Speech course at Penn State, which many students defer as long as possible due to the common fear of public speaking (an affective learning issue). Therefore, it’s possible that these upper-division students are either more likely to overestimate their abilities (as Gross and Latham suggest) or be especially biased to respond in a positive way, if they are overcompensating because of their class standing or lack of skills.

Similarly, it would be of interest to learn something about students’ prior affective learning experiences related to the research process before measuring it directly. Students enter our classrooms with prior knowledge and skills, and there is much discussion about pedagogical techniques for grappling with this diversity of cognitive skills among a classroom of students. While some students may have had very positive experiences with the research process in high school or a prior course, it’s safe to say that some certainly have not. This would be especially true in a state like Pennsylvania, where there is uneven distribution in the quality and support of school libraries. However, since we know that affective learning is as important as cognitive learning and can even have an influence over cognitive learning, a future study might explore not only how to assess, but also how to address, students’ variety of affective learning. This type of study would
assist not only upper-division students in any class, but could elucidate other factors that may help students’ affective learning overall.

Replicating this study on a broader basis could reveal larger trends related to affective learning and would show if the trend found in this study held true in a larger sample size. Of particular interest would be specific sub-populations, such as first-year students, upper-division students, students in specific majors, and graduate students, to see how these groups’ affective learning compare to the findings in this study. Subject-specific information literacy instruction would be a particularly interesting test bed for affective learning. Questions worth exploring in future research would be those such as: “How do students enrolled in core classes for their major differ affectively from students taking general education classes?,” and “Are students who are taking required courses in support of their major more confident because the course covers a subject they’re more inherently interested in?,” or “Is a student’s affective learning more disrupted in core courses because of feeling there’s more at stake?.”

It’s also important to note the difference in the type of assessment when comparing findings from Gross and Latham’s study and this study. The Gross/Latham study did not account for anonymity since students were tracked in order to provide incentives, including an extra incentive for high scores. This factor is an important one related to affective learning, and could have influenced student responses related to confidence levels if they felt it would impact their incentive or outcome. Gross/Latham’s study also measured perceived confidence in self-reports compared to actual competence. The research study discussed here measured students’ change in confidence levels before and after a library instruction session and was concerned not with measuring their actual abilities, but with affective learning related to their confidence in finding sources. Even if students are overestimating their abilities at the beginning of the session, the fact that the pre-class assessment was followed immediately by instruction can serve to alleviate some of this imbalance because, according to Gross and Latham’s theory, as well as in Kulthau’s words, “as competence is developed, an individual’s ability to self-assess also improves.” By taking action at this point in the learning process in order to show students where there are gaps in their understanding or by teaching them new skills, the librarian is beginning to raise students’ ability, to better align with their own estimation. The moment of revealing the change in confidence levels via a poll at the end of the instruction is also a crucial time to reinforce the librarian as a resource for further assistance. At the moment when some students are responding with a “Very Uncertain” confidence level, the librarian is perfectly poised to intervene and appeal to these students with an offer to meet with or assist them further. “Catching” these students before they fall through the cracks is a unique opportunity to influence their affective learning and driven home by the results right in front of their eyes, thanks to power of the response system. Additionally, if students are overestimating their skills
to ‘save face’ on their part or the part of the instructor, this moment is still a powerful opportunity to offer help in a way that doesn’t identify specific students.

That no significant change was found in the total number of students who responded with “Very Uncertain” post-class could indicate deeper problems than just a lack of information literacy skills, such as indecision about a topic, lack of understanding about the assignment, or even general apathy related to the course. Students who responded in this way after the session were specifically reminded that several ways to get help exist and clarifying a topic or question about the assignment with the instructor would be prudent. However, as Gross and Latham also note, the issue of how to respond to students who have below-proficient information literacy skills, but don’t identify them as such, is complicated and could benefit from further study.34

This method of assessing affective domain affords two opportunities for the librarian to make an impact on students’ affective learning. As Mertler reminds us, there are two main purposes of assessing the affective domain: providing individual-level information or to revise group-level instruction.35 In the pre-test poll, the librarian has the option to use the responses to alter or reframe the instruction for the class based on the results of the poll. Additionally, there is an opportune moment at the end of the class to intervene with students who may be leaving the research session feeling uncertain in their research abilities. In this case, students have just finished self-identifying as uncertain of their abilities. This self-knowledge on the part of the student can be very meaningful for augmenting their future learning and is important to their affective learning and in turn, their cognitive learning. As noted in the literature review, students’ feelings about research are often an indicator of how successful they’ve been in conducting research. Fortunately, the librarian can also take advantage of this “intervention moment” to offer assistance to these students, which can further advance their affective and cognitive learning. Whether a student is underestimating their abilities, “saving face” by responding with a dishonest answer, or responding truthfully about their poor abilities, an opportunity exists to make a connection with these students, offering them more assistance to increase their affective learning at another time. Future studies could investigate how best to make a connection with these students, under what circumstances they prefer to get remedial help, and if remediation assists with their affective learning.

Another way affective learning could be improved is with professional development for instructor librarians. While assessment of affective skills hasn’t been widely adopted by higher education or libraries, it has been recently introduced in the American Association of School Libraries’ “Standards for the 21st-century Learner in Action,” which is a solid first step in recognizing the importance of affective learning. Schroeder and Cahoy stress that together, the cognitive and affective domains present a true picture of student learning and adding affective outcomes to the Association of College and Research Libraries’ standards would “humanize the standards” and serve as a reminder for libraries to monitor the affect.36 With the addition of affective outcomes to learning standards, students’ needs in this domain will most likely get the recognition they deserve, in order to be assessed and addressed during library instruction. However, instructors will likely need training in this area, as it has not been given much emphasis in the past. Similarly, administrators and others will need to be made aware of this area and why it’s important to study and address it.
In light of the literature about assessment of affective learning with regard to benefits, challenges, and recommended methodologies, using an open-ended student response system as presented here was a success for several reasons, including: real-time capture and assessment of students’ affective needs; maintaining anonymity; no need for distribution of extra equipment or instructions; ease of use; minimal time and effort involved; aggregated data helping to mitigate any dishonest answers; and the allowance for collecting a large sample. Further research comparing and contrasting different types of response systems for assessment of affective learning, as well as larger studies about affective learning related to information literacy skills, would be nice additions to the currently small body of scholarly literature. As awareness of affective learning grows, brought about by the addition of affective outcomes to information literacy standards, new research will begin to reveal a better picture of students’ affective learning and strategies for addressing these needs, both in and out of the classroom.

Conclusion

This study showed a significant positive improvement in confidence levels for students receiving library instruction. The evidence strongly suggests the session helped students to feel generally more positive about their abilities to find sources for an assignment. This is further validation that library instruction improves students’ learning, especially with regard to the affective domain. As noted in the literature review, the affective domain is closely tied to the cognitive domain. Armed with not only an awareness of their learning, but an increase in confidence about their information literacy skills, students are more likely have positive behaviors and productive results. Once aware of their feelings or other affective constructs, students are in a better position to alter their learning, which can lead to more success in the classroom. Similarly, with this knowledge, librarians are in a better position to lead learners to additional assistance or resources to improve their skills.

This research study was also successful in determining that student response systems can work well for purposes of measuring affective learning because they address the most important factors related to assessing affective constructs: anonymous participation, ease of use, frequent measurement, and a high participation rate. Tools such as Poll Everywhere offer additional assets, including instant responses (in the aggregate or individually) via a variety of mechanisms, and easy export of data for analysis.

Student response systems help students acknowledge their feelings and attitudes related to the research process, which is essential to their growth as lifelong learners. Since the affective and cognitive domain are closely tied together, instructors who evaluate students’ affective learning are helping students understand the level of their skills and relieve their anxiety about using information resources. Librarians are in a unique position to address library anxiety experienced by novice library users, and student response systems are primed to assist librarians with this. In summary, this study has
shown library instruction to play a vital, positive role in student learning, this time with particular regard to affective learning.

*Emily Rimland is the Kalin Librarian for Learning Innovations, Pennsylvania State University Libraries, email erimland@psu.edu.*

**Appendix A**

**Library Instruction Evaluation Form**

Please let me know your thoughts about your library session for this course. Circle your responses after the questions, and feel free to explain your answers in the margin.

1. I used library resources to research some of my assignments in this class.
   - True
   - False

2. If you answered ‘True’ to question #1, list the library resources that you used.
   (example: books that you found using the library catalog; magazine or newspaper articles from a database, journal articles, etc.)

3. The library instruction that I received this semester caused me to be more critical of web sites and other information sources that I use for assignments.
   - True
   - False

4. As the semester comes to an end, how satisfied do you feel about your ability to find and use appropriate sources for your assignments? (circle one)
   - Very satisfied
   - Satisfied
   - Neutral
   - Unsatisfied
   - Very unsatisfied

5. If you used library resources, do you feel that they helped you to achieve a higher grade on your assignments?
   - Yes
   - No

6. If you participated in the cell phone/texting poll used in the library session, please rate your satisfaction with it as a tool to facilitate classroom participation? (If you didn’t participate, skip to #6)
   - Very satisfied
   - Satisfied
   - Neutral
   - Unsatisfied
   - Very unsatisfied

7. Do you have any additional comments?

Thank you for taking the time to complete this survey!
I appreciate your feedback!
Notes


29. King, *Affective Education in Nursing*, 207.

30. Gross and Latham, “What’s Skill Got to Do with It?,” 582.

31. The MANOVA test is used in many types of research, as Godby summarizes, “where several responses are measured on each experimental unit (subject) and experimental units have been randomly assigned to experimental conditions (treatments).” The MANOVA method is often used when more than one response variable is used (in this case five: confident, neutral, uncertain, very confident, very uncertain) to compare several groups (pre- and post-class responses from numerous sections). Mary Earick Godby, “Multivariate Analysis of Variance,” in *Encyclopedia of Epidemiology*, ed. Sarah Boslaugh and Louise-Anne McNutt, (Thousand Oaks, CA: Sage, 2008), 701.

32. For these cases, the p values were found to be greater than .05, which is the standard threshold for significance.


34. Gross and Latham, “What’s Skill Got to Do with It?,” 582.


36. Schroeder and Cahoy, “Valuing Information Literacy.”