International Journal of Teaching and Learning in Higher Education 2022, Volume 34, Number 1, 36-44
http://www.isetl.org/ijtlhe/ ISSN 1812-9129

"Dogs are a lot cuter": An Analysis of Student Perspectives on an Operant Conditioning Laboratory at an Animal Shelter

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High-impact experiences, such as service-learning opportunities or hands-on laboratories, have been shown to enhance student learning, course satisfaction, and attitudes and behaviors. Thus, it is essential to incorporate these experiences into psychology curriculums when possible. However, it is also critical to analyze the impact of these experiences. The purpose of this study was to investigate student opinions of a service-learning laboratory experience to determine how impactful it was. Twenty-three psychology master's students who completed an operant conditioning laboratory at a local animal shelter were surveyed about the experience. Although students did have recommendations for improvement, the laboratory was viewed as effective and impactful. Students highlighted many aspects of the laboratory and indicated that it was educational and enjoyable. Service-learning experiences such as these can impact student learning and personal growth while also impacting the community. Instructors should consider offering these experiences but should be aware of challenges in implementing a laboratory such as this one.

Hands-on experience and active learning are often emphasized in the sciences and have also been stated as a goal in the social sciences. In fact, the APA Board of Educational Affairs Working Group on Strengthening the Common Core of the Introductory Psychology Course (2014) recommends adding a laboratory component to introductory psychology. However, although most introductory courses have various research activities integrated, a full associated laboratory is rare (Peterson & Sesma, 2017). Traditionally, this integration has been seen in psychology learning courses. The concepts taught in these courses can be difficult for students to comprehend and various course techniques have been used to meet learning outcomes (Epting & Green, 2011). Additionally, these courses consist of concepts with a high level of applicability, thus they are a logical class for using experiential learning (McConnell, 2016). In many cases, these courses include hands-on demonstrations in which the students take turns acting as trainer and trainee (e.g., see Epting & Green, 2011; Goodhue et al., 2019), with these demonstrations reported by students to be helpful and enjoyable.

Often, the experiential learning is in the form of laboratories taught using live rats or pigeons. These laboratories can be beneficial, but there are many limitations to using live animals. Animal facilities may not be available for all instructors (Epting & Green, 2011), and many institutions are unwilling to provide the space or pay the high costs to set-up and maintain animal facilities for teaching (for discussion, see Goodhue et al., 2019). Additionally, even though skill development is viewed as crucial in student training, there are ethical considerations to keeping animals on campus solely for teaching purposes. Overall, full animal facilities for teaching laboratories are declining on campuses, forcing instructors of learning courses to be creative. Hazel et al. (2015) described a laboratory experience in which students trained chickens and found that students met learning goals and also experienced a positive shift in attitudes towards chickens. Epting and Green (2011) described a range of species other than rats, from planarians to goldfish, used to train operant conditioning. Goodhue et al. (2019) also discussed the range of species and mentioned cockroaches and lobsters. Additional species used in teaching of psychology are listed in Flint and Anderson (2011). However, it can be difficult to fund and get approval for even these species.

Graham et al. (1994) asserted that although learning operant conditioning by training an actual rat in an operant chamber is superior, the related expense and ethical considerations have decreased the number of students who have been able to be trained through this method. They, along with other researchers, (e.g., Graf, 1995) recommend using computer programs like Sniffy or Cyberrat as a virtual substitution for operant chambers. These programs have been praised for being lower-cost and widely available and allow students to practice basic skills, like timing and developing a shaping plan. These programs also provide data for students to interpret and use in assignments. However, these programs also have drawbacks, such as being much more limited than live animals, seeming artificial, lacking full transferability, and suffering from technical issues (Goodhue et al., 2019). Venneman and Knowles (2005) demonstrated that Sniffy did increase exam performance compared to only classroom instruction and extra study time focused on schedules of reinforcement, suggesting that Sniffy does have benefits for students. However, students have been found to prefer live rats (Elcoro & Trundle, 2013) and these virtual rat programs are very regimented, thus lacking the "real-world messiness" of working with live animals (McConnell, 2016, p. 312) . Of greater concern is the fact that Sniffy has not been regularly updated and Cengage has decided to no longer update the program (Cengage

representative, personal communication, October 14th, 2019). Cyberrat still exists but also lacks regular updating.

Alternatives involving other live animals not on campus have also been found to be effective. Lukas et al. (1998) reported on a unique laboratory experience at Zoo Atlanta in which students shaped various species and behaviors. This laboratory experience was effective in terms of student learning outcomes and evaluations. Another potential option is to have students train animals in shelters. McConnell (2016) discussed how dog training is a good choice for experiential learning of the course concepts and discussed a pilot study of integrating training at a dog shelter in an eight-week course with five students. A similar separate course was developed by Kogan and Kellaway (2004) who reported that students performed well in the course and gave mostly positive feedback.

In addition to allowing students to apply the theoretical concepts learned in class, the positive reinforcement training is also beneficial to the animals in the shelter, which is a stressful environment (Reid & Collins, 2015). Positive reinforcement training can be considered a form of environmental enrichment, which can improve animal welfare, mainly because it provides increased environmental control and choice (Laule & Desmond, 1998; Westlund, 2014) and aids in socialization of the dogs (Reid & Collins, 2015). Additionally, training has been found to make dogs more likely to be adopted (Luescher & Tyson Medlock, 2009) and less likely to be returned (for review, see Reid & Collins, 2015). Unfortunately, other research has found that training does improve behavior, but not necessarily adoption rates (Herron et al., 2014 ; Protopopova & Wynne, 2016). Pet selection is a complicated process, often driven by factors such as morphology (Protopopova & Wynne, 2016), and this area requires additional research given the complexity and limitations of many of these studies. While it can be difficult to directly link such training to increases in adoption, improvements in behavior and welfare are still desirable outcomes and may improve behavior after adoption, which could enhance the rates of successful adoptions given that behavior is often cited as a reason for relinquishment (New et al., 1999). Additionally, the students could engage with individual animals at a deeper level and perhaps discover important information about them that could inform the shelter and future owners. Simply understanding the personalities and behavioral challenges of a dog may help with placement (e.g., not in a home with a cat or other dog) and help provide the new owner with potential solutions (Reid & Collins, 2015).

Whether the lives of the animals are improved through only welfare enhancement or both welfare and adoption success, conducting a learning laboratory in an animal shelter creates a mutually beneficial situation. Therefore, this experience is a service-learning opportunity, given the link between the application of student learning and community service to the shelter. Specifically, service-learning combines the service experience with reflection to enhance the learning component. These reflections can involve discussions, journal entries, or papers that align the experience with the course content (Conway et al., 2009). Service learning has been shown to improve academic performance, course satisfaction, civic responsibility, and community engagement (for discussion see Hébert & Hauf, 2015). Bringle et al. (2016) emphasized the importance of ensuring that graduates are well-rounded and psychologically literate, and they claimed that service learning experiences help meet that goal. McDonald et al. (2005) discussed a service-learning experience from the perspectives of a faculty member (McDonald), student (Caso), and shelter staff (Fugit). For their laboratory, students were offered extra credit to participate. The faculty member reported that students were able to better connect with class material and the sense of giving back. Furthermore, the shelter staff member asserted that relinquished dogs require human contact and even simply the interaction was beneficial for behavior and welfare. Additionally, when students walked the dogs, they were freeing up shelter staff to perform other tasks. Therefore, this anecdotal report concluded that the laboratory was a success and recommended widespread use.

The current study was undertaken to investigate a similar laboratory experience required in a graduate level Psychology of Learning course. For this course, the description was focused on behavioral theory and exploring similarities and diversities in the behavior of human and non-human animals. The course was focused around two central questions: (a) How does learning happen? and (b) How can learning theories improve my life? The fundamental concepts through which to explore these questions were past histories of conditioning, temporal relations, and frame of reference. The operant conditioning laboratory was a central component of the course. The current study focused on the student opinions of the experience to determine how a service-learning laboratory impacted their self-reported learning and growth. Additionally, student feedback was used to discuss important points to consider in designing a similar laboratory.

Methods

Participants

All participants were master's level psychology students enrolled in the Learning Principles course at University of Houston-Clear Lake (UHCL). In fall 2018,

the course occurred at a satellite campus located in Pearland, Texas, which tends to have smaller classes. There were 10 students (8 females, 2 males) who completed the course that semester. The fall 2019 course was conducted at the main UHCL campus and 24 students (19 females, 5 males) completed the course, but only 23 students completed the questionnaire. Therefore, there were a total of 33 participants.

Laboratory Experience

When this course is offered by other faculty, the students train rats for the laboratory. However, when I first taught this course, it was at the Pearland campus location and the rats were not available, so I was asked to develop an alternative. Therefore, I developed and piloted a dog training option offered at BARC animal shelter in Houston, Texas in fall semester 2015. However, the survey assessment was conducted in my subsequent offerings in the fall semesters of 2018 and 2019. The laboratory was approved by the University of Houston-Clear Lake Institutional Animal Care and Use Committee and the assessment of it was approved by the Committee for Protection of Human Subjects. Before the students began the experience, they were required to undergo relevant trainings, namely Collaborative Institutional Training Initiative (CITI) modules and campus provided Occupational Health and Safety trainings relevant to working with animals, specifically dogs and cats. There were also various forms that students were required to fill out related to the laboratory. Additionally, in order to ensure student training was beneficial to the shelter, they completed several assignments to help prepare them to apply operant conditioning with these species. These included engaging with shelter documents and provided videos on relevant behaviors (e.g., handling for dogs, shy dogs, cat body language). Additionally, students were required to complete a report on Karen Pryor's (2006) book *Don't Shoot the Dog* and four assignments using a virtual rat program, to help them better understand the complexities of operant conditioning. Students were also required to attend a general volunteer orientation at the shelter as well as a hands-on training conducted by a professional trainer who instructed students in dog and cat handling, which included observing students getting dogs out of kennels and runs and walking on a leash.

Once students were fully trained, they were allowed to self-schedule times in which to come in and train dogs and/or cats. After the required trainings, students were asked to complete 25 hours of training across about 10 weeks of class. The initial plan for 30 hours, or 3 hours a week was reduced because of delays in scheduling training and student feedback. Students were allowed to train any adoptable animal, thus allowing for accommodations for health concerns such as allergies or fear. Additionally, there was always the potential for an individual animal to be adopted or off-site at an event, so students were required to be flexible and may not have been able to train the same animal week after week. Overall, based on discussions and student reports, most students trained a wide variety of dogs and cats, suggesting that they likely covered a full representation of the animals at the shelter.

Students were instructed to include training for behaviors more directly related to welfare and possible adoption enhancement, such as four-on-the-floor (training not to jump up at visitors and overwhelm them), loose leash walking for dogs (training not to pull when being walked), and coming to the front of the cage and allowing handling for cats (both training to be more visible and social). Four-on-the-floor and coming to the front of the cage allowed students to walk around the section of the shelter and train multiple individuals, whereas the other behaviors required students to get an individual animal out of a run or enclosure. Students were asked to train both types of behaviors. Additionally, students could do more in-depth training, including shaping behaviors such as sit or target, with individuals. Students were allowed to use shelter provided treats or bring in approved reinforcers, such as pieces of chicken or hot dogs, themselves. Students were required to keep a training journal to document their experience and produce a 3-5 page paper reflecting on the laboratory. They were instructed to take careful notes in their journal of their training, including an hour log, animals worked with, behaviors trained, and information such as challenges or successes. Journals were checked four times through the semester for progress. The reflective paper was to focus on the experience, such as what they learned, what they wish they had done differently, and their favorite experience.

Questionnaire

The questionnaire was adapted from Lukas et al. (1998). The questionnaire consisted of 10 Likert scale questions (7-point scale from 1=strongly disagree to 7=strongly agree, see Table 1) to assess student opinions of the laboratory itself and the activities required in preparation for it. Additionally, participants were asked three open-ended questions to address what they liked best about the laboratory experience: (a) What did you like best about the laboratory experience?, (b) What would you like to change about the laboratory experience?, and (c) Any additional thoughts?

Procedure

For each class, the survey was administered on the last day of class. Once informed consent was obtained, students were provided with a paper copy of the survey

and asked to complete it anonymously with the assurance that they would not be analyzed until after grades were completed.

Data Analysis

Given that no identifying or demographic data were collected, the quantitative data is presented mostly though descriptive analyses and then some comparisons. Cronbach's alpha was calculated to measure reliability, along with Mann Whitney-U comparing between semesters to determine if the data could be pooled. For the qualitative data, the focus was on content analysis, and responses to open-ended questions were examined for themes and extracted to illustrate some of the main points. Themes were developed by engaging in an initial reading of all answers to gain an understanding of the answers. After the initial reading, preliminary themes were developed, and the answers were coded using these themes. During coding, a few themes were split, and data were recoded as needed. The final themes used in the analysis were references to species and comparisons to rats, difficulties because of distance or time, aspects of the shelter environment, aspects of the laboratory set-up, the applied nature of the laboratory, and the service-learning aspects of the laboratory. After coding, the answers assigned to each theme were re-read as a group and adjustments were made as needed. The different questions were coded individually, but in a complementary method using the same themes. All participants provided an answer to what they liked best and what they would change. For the additional thoughts question, if they addressed the laboratory, they were categorized using the themes, but if they addressed other aspects of the course unrelated to the laboratory, such as exams, they were excluded from the analysis.

Results

Quantitative Data

Given that no identification data were collected, the current paper cannot give specific statistics on student learning. However, the classes overall performed very well. All 34 students received an A on the lab reflection paper and no lower than a B- as a final class grade, thus students were able to meet the learning outcomes of the service-learning laboratory experience and the course as a whole. Based on survey ratings, the laboratory was viewed as effective and impactful (see Table 1). For most of the questions, the average rating was above *somewhat agree*. The only question with a low level of average agreement is the one relating to the virtual rat program. The survey was found to have high reliability (10 items; $\alpha = .94$). For the comparison between semesters, the ones that differed were ratings of Cyberrat, overall learning, and how pleased they were with their performance.

Qualitative Data

Additional information is available in responses to the open-ended questions (see Table 2). As stated previously, the themes that were identified were references to species and comparisons to rats, difficulties because of distance or time, aspects of the shelter environment, aspects of the laboratory set-up, the applied nature of the laboratory, and the service-learning aspects of the laboratory.

The main criticisms of the course were the time and commute required. The feedback from the first semester did lead to a decrease in hours initially required from 30 to 25 during that semester, but students still wanted less time commitment. Many mentioned wishing there was a closer option, given that BARC was about 25 miles away from each campus location, saying things such as, "I wish it were closer to my home" and "Having a shelter that is closer to campus so that students will not have to specially drive out." In total, 24 (72.7%) mentioned something about the time or distance required. Many mentioned it related to having busy schedules, but occasionally it was a more focused complaint, such as the student who simply wrote, "Distance!!!" However, many of these did still frame it mostly positively, such as a student who stated, "The shelter itself is great and I loved the lab experience, the distance/travel is what got me."

There were a few other negative comments related to the structure of the course, such as requiring a lot of readings and preparations before training to ensure students were ready to train dogs ("having to read 'Don't shoot the dog' so quickly at the beginning was extremely stressful"); making the course front-loaded ("Most of my understanding came from retrospectively reflecting on the material"); or the shelter, such as difficulty of finding shelter staff when needing assistance, the shelter website ("Website was difficult to navigate"), or the fact that it was not a no-kill shelter ("A no kill shelter or rescue"). For some, they mentioned some aspect, like not being able to train the same individuals every week because of adoptions, but they were realistic in understanding that adoption is the goal of the shelter. For instance, one student said they would like to change "the fact that you couldn't consistently train an animal over time, however, that's more of a 'Just how it is' type of thing."

However, there were also many positive comments related to the way the laboratory was designed to allow a lot of flexibility in both times to go and animals to work with. For instance, one student said, "I liked that I had the option between dogs and cats. This showed me how different animals can be but also how similar they can be. It also prevented me from getting bored".

Table 1
Student Survey Responses Fall 2018 and Fall 2019

	Combined (n=33)				Fall 2018 (n=10)				Fall 2019 (n=23)				Comparison Between Semesters		
Statement	*M*	*SD*	*Mdn*	*Mode*	*M*	*SD*	*Mdn*	*Mode*	*M*	*SD*	*Mdn*	*Mode*	*U*	*z*	*p*
1. Karen Pryor's (2006) book, *Don't Shoot the Dog,* was a valuable tool for understanding the principles of training.	6.12	1.27	7	7	6.00	1.90	7	7	6.17	0.87	6	7	94.5	-0.875	0.38
2. Cyberrat was a valuable tool for understanding the principles of training.	4.85	1.74	5	6	5.70	1.68	6	6	4.48	1.64	5	5	54.0	-2.458	0.01*
3. "The Training Game" (Pryor, 2006) is a great way to understand the animal's perspective during training.	6.00	0.98	6	6	5.90	1.30	6.5	7	6.04	0.81	6	6	110.0	-0.208	0.84
4. Speaking to BARC staff (e.g., Nancy Kelly) was helpful in learning about the animals I had to train.	5.55	1.56	6	7	5.50	2.01	6.5	7	5.57	1.31	6	7	104.5	-0.428	0.67
5. The handouts and videos provided were helpful in learning about the animals I had to train.	5.52	1.46	6	6	5.30	1.85	6	7	5.61	1.24	6	6	113.0	-0.082	0.94
6. Overall, I learned a lot in the laboratory.	5.70	1.00	6	6	6.10	1.14	6	6	5.52	0.88	6	6	64.0	-2.146	0.03*
7. Overall, I was pleased with my own performance in this laboratory.	5.82	0.90	6	6	6.20	1.17	6.5	7	5.65	0.70	6	6	60.0	-2.319	0.02*
8. Overall, participating in this laboratory was a positive experience.	5.79	1.22	6	7	6.10	1.45	6.5	7	5.65	1.09	6	6	76.0	-1.595	0.11
9. I prefer this laboratory experience to training rats.	5.67	1.47	6	7	6.20	1.17	7	7	5.43	1.53	6	7	81.0	-1.412	0.16
10. I will recommend this laboratory to other students at UHCL.	5.45	1.50	6	6	5.40	2.15	6.5	7	5.48	1.10	6	6	93.0	-0.082	0.37

Note. Based on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Asterisk indicates significant for Mann Whitney U.

Table 2
Counts and Percentages for Comments for Each Theme

	Fall 2017 (n = 10		Fall 2019 (n=23)		Combined (n=33)	
	n	%	n	%	n	%
Distance/Time	9	90	15	54	24	73
Dog/Cat	8	80	12	52	20	61
Aspects of Lab	3	30	7	30	10	30
Service Learning	2	20	6	26	8	24
Shelter	1	10	6	26	7	21
Rat	4	40	4	17	8	24
Dog > Rat	4	40	4	17	8	24
Application	2	20	4	17	6	18
Front Loaded	2	20	2	9	4	12

Another simply said, "I liked the flexibility of shifts." Other students highlighted positive aspects of the shelter, mentioning how helpful the staff were and that they enjoyed learning about how a shelter operates. Although some students did mention that the self-paced style allowed them to procrastinate.

The species worked with, dogs and cats, were highlighted by 20 (60.6%) students with 8 (24.2%) specifically stating a preference for shelter animals over rats that would have been worked with in the classes with other faculty. Most students who mentioned species were clearly on the side of shelter animals, saying something like "I like that we are working with dogs instead of rats" or "rats wouldn't have been as enjoyable." Students would highlight aspects of dogs and cats such as more behavior variance, more sociable, more unpredictability, and that "dogs are a lot cuter." No students stated only a direct preference for rats; however, one student said both, "I did enjoy learning using dogs rather than rats since I'm a dog owner myself" and "I also looked forward to working with the rats in a Skinner box since I have spent years in class hearing about it." Another mentioned the drawbacks of distance and not feeling like they were really shaping behavior because they had to constantly work with new dogs, but then mentioned how great the volunteering made them feel and that they would "much rather train dogs than rats." Several of the students who declared a preference for dogs also mentioned aspects of the rat laboratory that would be preferred, such as Skinner box experience or location of the rat lab.

A few students (*n*=6, 18.2%) directly mentioned the hands-on application of the course and how they developed skills or better learned the concepts because of the course. Making statements like, "I learned more about operant conditioning because of this lab" and that they liked "Using what we learned in class, in real life with real animals." Another student was very enthusiastic, stating, "Going to BARC was a lot of fun! I felt like it was a great alternative to apply learning theory."

Many students alluded to aspects of service learning and eight students (24.2%) directly mentioned service-learning features, such as helping dogs be less fearful or get adopted. One student mentioned the application aspects and the service-learning aspects with their comment that they liked "[t]he hands-on aspects and actually having a purpose for the work rather than just for a grade", while another appreciated "being helpful while gaining lab hours." Another stated, "I liked that I was doing something positive by helping out at the shelter."

In general, the comments were mostly positive. Students said things like, "Overall, great experience" or "[a]lthough there were a lot of assignments, I wouldn't change anything." Another stated, "I really enjoyed the lab, I was able to meet fantastic people and animals." The laboratory experience was clearly very impactful to many students. One student mentioned continuing to volunteer. From discussions with students, I know several students did continue to volunteer as well as several who fostered or adopted a pet.

Discussion

Overall, it is clear through the survey responses that the laboratory was viewed as impactful to learning outcomes and personal growth of students through the service learning experience, which is in line with previous research that has found service learning to benefit academic, personal, and social outcomes (Conway et al., 2009). Even though there were some complaints about the experience, the students clearly recognized the benefits, and through ratings and comments indicated that they were glad they participated in it. The concepts taught in this class, such as temporal relations, can be difficult and experiential learning of these principles can help with class learning and addressing the central questions of the course. Overall,

the service-learning experience was in line with recommendations from Conway et al. in that it emphasized reflection. The main components were the training journal entries and the reflection paper, but there were also check-ins and class discussion time in which students could reflect and share. Experiences such as these also have benefits beyond general classroom instruction and in this case, beyond assigning a virtual rat program. Students clearly appreciated these benefits based on survey responses and the fact that almost a quarter of the students mentioned aspects of service learning. Such service-learning experiences allow students to gain a sense of contributing.

There were a few differences between the two semesters; however, there was also a noteworthy difference in sample sizes derived from the different campus locations; the differences between means on the three items were all less than 1.25 scale points with the values for both semesters trending in the same portion of the scale. In fact, only one question differed by more than 0.6 scale points and that was the question about the value of Cyberrat, which did have more technical issues in Fall 2019, which likely impacted ratings. Overall learning and being pleased with their laboratory performance were significantly different but would all round to a rating of "Agree," suggesting that learning and performance were perceived as high in both semesters.

The current study opted to prioritize confidentiality to examine student opinions with depth and enhance the likelihood of an honest assessment. It does appear that this strategy was effective given the variance in responses and high amount of constructive criticisms of the laboratory. However, a limitation of the study is that it could not include comparisons based on class performance or a true examination of knowledge or attitude change. All students were able to earn A's on the reflection paper, but it is unclear if opinions of the laboratory correlated with performance on examinations and assignments. Research has found that for in-class experiences, enhanced enjoyment does not always translate to enhanced learning (Poonati & Amadio, 2010). Other research has found that engaging applied class experiences have led to attitude change (Hazel et al., 2015), enhanced learning, or both (e.g. Kogan & Kellaway, 2004; Lukas et al., 1998). Future research should focus on examining the relationship between high performance in this laboratory and on course assessments. Specifically, it would be useful to have a pre- and post-test to examine knowledge and attitude change.

This laboratory also was beneficial to the shelter. Shelter staff commented on how helpful the students were and appreciated having additional individuals walking the dogs. The fact that several students continued to volunteer after the semester and a few reported adopting dogs, suggests how impactful the experience was and clearly showed direct benefits to the shelter. Students also reported interacting with the public, which was likely also beneficial to the shelter. The animals benefitted by receiving needed care, human contact, and enrichment. Human contact has been shown to improve behavior and reduce cortisol in shelter dogs (Coppola et al., 2006; Menor-Campos, 2020; Shiverdecker et al., 2013). Additionally, improvements in general behavioral issues may have impacted the individual animal's welfare and may have also benefited those in surrounding enclosures. For example, four-on-the-floor training should help reduce the high level of excitement and barking when someone walks by and makes a calm reaction to a visitor more likely, reducing shelter noise levels. Future research should track the behavior of dogs trained in a laboratory such as this to examine behavioral changes to determine the significance of the benefit.

Although the laboratory had many benefits, there were also challenges in forming a collaboration with a shelter. The shelter administration has to be willing to allow students to come in and train animals, commit to filling out paperwork, and also be willing to allow an inspection by the university Institutional Animal Care and Use Committee. In the current case, the only feasible option was a considerable distance away, which was problematic for students. Additionally, there is a large time commitment for the instructor in setting up this affiliation, completing the paperwork, and assisting with the rest of the approval process. All of this commitment is in addition to the class and laboratory preparation.

Even though potential laboratory locations may be limited, the commute to an off-campus site is going to be problematic for busy students and creates potential accessibility and equity concerns. Additionally, one student had to switch classes because of a transportation issue. The laboratory was not a set schedule in an attempt to allow for flexibility of timing and to spread out when students were at the shelter, but perhaps having a set schedule would allow for easier planning by students. Students were encouraged to carpool, which many did. However, it is important to acknowledge that the laboratory requires an investment of time and money. It is important to consider the burden on students, many of whom have work or family responsibilities, and often are less likely to choose to engage in high-impact practices (Kinzie et al., 2008) , such as service learning, perhaps because of these responsibilities. Although these experiences can be very beneficial to students, it is essentially to ensure they are accessible for all students, particularly underserved students (Finley & McNair, 2013). In a case like this laboratory, it might mean providing university transportation or raising

money for gas.

Additionally, it is essential to ensure that students are well prepared before they jump into training, but the course could be improved by decreasing or spreading out some of the preparation work to better align with course material covered and not be as overwhelming in the beginning. An additional limitation of this study was the lack of a control group. Future research could compare the traditional rat laboratory to this service-learning experience. Additionally, future offerings might consider making the laboratory optional and comparing class performance between the groups, which might be informative even though the groups would be self-selected. However, alternatives would need to be offered to ensure the accessibility concerns did not impact grades.

Despite the challenges, this laboratory was a worthwhile undertaking. It was mutually beneficial and hopefully had impact beyond the semester itself. Both hands-on experiences and service-learning opportunities should be pursued to help promote deeper learning and enhanced student success.

Acknowledgements

I would like to thank Nancy Kelly, Amelia Nausbaum, and all BARC staff for making this laboratory possible and supporting my students.

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