





SYMPOSIUM

Symposium: Better teaching through science: incorporating the scholarship of teaching & learning

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ABSTRACT The Scholarship of Teaching and Learning, also referred to as SOTL, provides a framework for instructors to evaluate student learning and use evidence to determine pedagogical changes in the classroom. Engagement in SOTL challenges scholars to ask questions about their teaching practices and share with a larger community of practice. Examples of this include manuscript submissions to peer-reviewed journals, presenting abstracts at conferences, and other outlets that allow scholars to disseminate their findings. SOTL practices can be applied within an individual classroom or across a curriculum. Additionally, the promotion and tenure process at many institutions of

higher education are highly recommending that faculty demonstrate impact on student learning. This symposium, presented at the 2022 Poultry Science Association Annual Meeting, highlighted best practices in SOTL, implementation of SOTL programming, and discussed using SOTL as a tool to evaluate teaching effectiveness. Poultry and animal science educators shared their experiences with implementing SOTL in their classroom and the benefits to students. From this symposium, we can conclude that there are multiple ways to document teaching excellence and conduct SOTL projects. This is of interest to educators implementing scholarly teaching in their classrooms.

Key words: scholarship of teaching and learning, active learning, teaching

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SECTION 1: A SOTL ROADMAP FOR POULTRY EDUCATORS

Elizabeth L. Karcher

What is Teaching Excellence? Over the last two decades, there has been an emphasis on creating student-centered, inclusive classroom environments that engage and motivate students. Strategies often adopted by instructors include hands-on activities and critical reflections. Teaching excellence takes on many forms, but it emphasizes moving beyond the traditional classroom environment, where the focus is exclusively on the

instructor and the student passively listens. Baker et al. (2005), from Pennsylvania State University's Schreyer Institute for Teaching Excellence, reported the following 5 attributes of excellent teachers: 1) subject matter experts; 2) pedagogical experts; 3) excellent communicators; 4) student-centered mentors; and 5) systematic and continual assessor. These 5 attributes stress the ability of a teacher to not only effectively communicate the course content, but also have good rapport with their students. Excellent teachers utilize evidence-based decisions for their classrooms. They critically reflect on course experiences to determine if learning outcomes have been met and respond accordingly. Teaching excellence includes continuous professional development and peer discussions to inform best teaching practices. Taken together, these attributes and activities promote an inclusive learning environment that challenge students to not only learn course content but fosters curiosity and self-directed learning.

Scholarship of Teaching and Learning The scholarship of teaching and learning (SOTL) challenges excellent teachers to move beyond applying the knowledge

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generated by others in their classroom and begin to generate their own questions. This systematic inquiry process allows teachers to find answers to their self-generated questions within their own classrooms. Felten (2013) described 5 characteristics that together encompass principles of good practice in SOTL. These include: 1) inquiry focused on student learning; 2) grounded in context; 3) methodologically sound; 4) conducted in partnership with students; and 5) appropriately public. The process of SOTL challenges teachers to develop a research question, utilize appropriate methods to collect data, analyze the data, and draw conclusions. Often teachers traditionally trained in STEM (science, technology, engineering, and math) disciplines, such as poultry and animal scientists, hesitate to engage in SOTL because they do not feel confident conducting a research project in teaching and learning (Kelly et al., 2012). It can be uncomfortable for those not familiar with social science research. However, the basic process of inquiry and exploration is similar, and teachers can collaborate with colleagues in Agricultural Education and Education for guidance. Perhaps the hallmark of SOTL is the dissemination of research findings. Excellent teachers conducting SOTL inquiry, not only apply the conclusions from their project to their classes but seek to share the results with a broader audience. This is often through presentations and manuscripts. Teachers participating in SOTL projects contribute to a body of knowledge that can guide other scholarly teachers when making classroom decisions.

Reflection on SOTL Research I began my SOTL journey in 2010 as an Academic Specialist at Michigan State University. Twelve years later, as an Associate Professor at Purdue University, my entire research program is based on SOTL. I encourage all teachers to find their why. What drives you to explore your classroom environment? It might be creating learning activities that engage and excite students or making sure they are mastering the course content in an introductory course. My motivation to conduct SOTL research stems from the ability to utilize data collected in my classroom to make evidence-based decisions in my courses. By doing this, I can begin to integrate the knowledge generated by others with the knowledge discovered through my inquiry. I thrive on sharing my conclusions with colleagues and participating in discussions related to teaching excellence. My SOTL journey has been positive and deeply rewarding and has allowed me the opportunity to engage and collaborate with other teachers from across my campus.

Potential Benefits of Participation The benefits of SOTL research extend beyond the walls of your classroom. Knowledge generated can be shared with others in animal and poultry science. Opportunities exist to share SOTL research results with others during professional annual meetings such as the Poultry Science Association, American Dairy Science Association, and American Society of Animal Science meetings. These associations are also affiliated with journals that will review SOTL-based manuscripts. Teachers wanting to

network specifically with others engaged in teaching and learning may consider joining the North American College and Teachers of Agriculture (NACTA). NACTA offers an annual meeting and hosts the *NACTA Journal*. Participation in SOTL can also be highlighted in promotion and tenure documents as evidence of teaching excellence. Finally, SOTL can promote critical reflection of our teaching practices. This reflection can be applied directly to classroom practices, but can also be demonstrated in the form of a course or teaching portfolio. A course portfolio is an excellent tool to document a SOTL journey in a course and demonstrate evidence-based changes that facilitate greater student learning. The portfolio can be shared broadly with others (including students) and included in promotion documents.

There are many ways to demonstrate teaching excellence. For many, this will include SOTL research. Contributions made through the SOTL process benefit not only the researcher's classroom, but the greater animal and poultry science community of educators. SOTL also provides a framework to demonstrate and share educational work with others. In the future, animal and poultry science educators must continue to explore educational questions related to the unique needs of our undergraduate students.

SECTION 2: THE SCIENCE OF LEARNING: A REVIEW OF ACTIVE LEARNING IN NON-ACTIVE SETTINGS

Dawn Koltes

In the animal and poultry science degree curricula, hands-on learning is valued by administrators and instructors alike. These "learning by doing" or experiential experiences are forms of active learning. Active learning is a process that requires the student to be involved in the instructional lesson whereas passive learning requires the student to receive and internalize presented material (Freeman et al., 2014; Deslauriers et al., 2019). Active learning leads to higher performance and is generally favored by students over passive learning environments. Unfortunately, not all courses can provide hands-on components to lesson delivery due to a variety of reasons that include but are not limited to course content, size of the class, layout of the instructional space, and delivery format. To mitigate some of these challenges for both the student and the instructor, the use of various active learning techniques can be implemented into lecture-based courses to encourage active learning.

Implementation of single lecture based active learning activities is an instructional strategy that can be easily implemented throughout a course. The strategies include slight changes to the course content provided to students that encourage notetaking and implementing cooperative learning techniques. As we have moved into the digital age, PowerPoint has become a mainstay in education, particularly collegiate lecture-based courses. Utilization of this tool in classrooms has allowed

instructors to quickly present content, present course content in greater detail and provide students the lecture content as a form of notes. Students have reported increased positive effects of having Powerpoint lecture content provided prior to class when asked about note-taking and study efforts (Frey and Birnbaum, 2002); however, if this lecture content is provided in a single monologue, material retention is less effective (Freeman et al., 2014). This results in the student not immediately engaging with the material which may be inhibiting memory formation. The simple act of taking notes forces students to immediately engage with the material presented and form memory constructs that can be recalled by the individual (Grahame, 2016). This form of engagement may result in less material covered at a single time as students require time to synthesize course content and write down that synthesized content. However, notetaking can be a method of active learning that can be used in courses of various enrollment size, assist an instructor in focusing on manageable learning objectives for the intended course level, provide clarity of learning objectives, and highlight difficult concepts before student assessment(s).

Cooperative learning activities can be incorporated in individual classes to encourage active learning. Within this technique, students are provided a limited amount of lecture based instruction followed by individual engagement with the course material then by cooperative groupwork. Generally, the groupwork is completed within the class period and requires students to take ownership of their learning through instructional roles with their peers. Johnson and Johnson (1990) developed several different methods of incorporating cooperative learning into traditional lecture-based courses. Notetaking pairs, jigsaw, and turn-to-your-partner activities are techniques that allow students to interact and explore lecture material together; whereas having students write out their muddiest or least understood point from the lecture and one-sentence summaries of the lecture tend to be more individualistic. All of these activities can be helpful to engage students with the material, but work only when students are held accountable for their learning and understood the activity and how it benefits the student. Many of these activities can be incorporated into individual classes, in classes of various sizes, and take between 5 and 20 min depending on activity and learning objectives. While many of these activities can be easily managed in large classes with only the instructor (e.g., having students report back after a think-pair-share), others (e.g., providing feedback from least understood concepts) would require significant time by an instructor or teaching assistant to address each point in a timely manner. Additionally, confused students may not actively engage with the material as they focus on the end-product more than the material. In summary this active learning method can be added into current lecture only course content with limited change. However, it should be cautioned that poorly deployed activities (e.g., unclear instructions, lack of student buy-in/

engagement, or lack of learning objectives) could hinder the active learning.

Similar to cooperative learning, problem- and project-based learning activities are ways in which students are provided material during lecture and must work as a group to complete a student driven project/problem. This teaching method has been effective at increasing student performance in courses (Login et al., 1997; Smits et al., 2003; Khatiban et al., 2019) as it requires students to be prepared for group meetings to discuss with their project/problem. This method, additionally, engages students in higher levels of learning using Bloom's Taxonomy and provide students the ability to practice soft skills in peer groups. However, development of groups that work well together can be difficult as there are individuals that either do not interact or those that do not complete assignments. Instructors must carefully construct groups and plan for difficult groups. Additionally, the time instructors spend preparing and grading problem- and project-based assignments increases as they are often group dependent. This likely will limit the use of problem- and project-based assignments in large enrollment courses and would require significant changes to assessments in traditional lectures that use individual exam given during class.

Lastly, flipped classrooms and team-based learning are very similar in that these methods place a larger emphasis of learning on the student by requiring the student to complete instructional content (e.g., lecture videos, reading of book chapters) prior to class. In a flipped classroom, the instructor facilitates discussions among the students whereas team-based learning the individual student takes an individual assessment then works as a team to take a similar assessment followed by immediate instructor feedback (Burgess et al., 2020). These models allow students to pace their own learning compared to traditional lectures and have shown to increase student performance (Hazel et al., 2013; Mitroka et al., 2020; Paralikar et al., 2022), however, these methods require significant shifts in the course structure compared to traditional lectures as both the instructor and student have a significant amount of work that is required outside the classroom. In the case of the collegiate student, time outside of the course may be limited between other course commitments, work commitments, and extracurricular activities. With the responsibility of learning the material for the team/class-discussion and significant commitments by students, it is a common concern that students will not engage with discussions as they have not completed work or rely on their group members to lead the discussion for the group. These methods have significant advantages through the engagement of students in a learning community and the material but require significant changes by the instructor and the student which may not be feasible with activities outside of the classroom.

In summary, engaging students in active learning can occur in the traditional classroom through a variety of methods such as notetaking, cooperative learning techniques, providing problem- or project-based learning

assignments and instilling team-based learning and flipped classroom designs. While many can require significant change in the course layout, others are more easily incorporated allowing instructors to identify and implement a methods or multiple methods. The use of active learning with the course material can increase student engagement and retention of material as well as decrease overall failure rates in the course.

SECTION 3: CAPITALIZING ON COVID-19 RESTRICTIONS TO IMPROVE ENGAGEMENT BETWEEN UNDERGRADUATE STUDENTS AND THE REAL WORLD OF ANIMAL AGRICULTURE

Frank E. Robinson, Martin J. Zuidhof, and Leanna M. Grenwich

Background An introductory animal agriculture class at the University of Alberta (AN SC 101) has successfully engaged undergraduate students with the livestock and poultry farming environment for over 3 decades. One key component of this highly successful approach to engaging students has been direct farmer contact. This has been achieved by bussing students to interact with a farmer and tour their operation during scheduled 180-min laboratory sessions. These visits (3 or 4 per term) were very well received by students (course evaluations), but incurred considerable cost, travel time, and on some occasions, cancellation due to inclement weather. With Covid-19 restrictions imposed during the Winter 2021 teaching term all in-person tours were cancelled. The instructors approached the Covid-teaching environment with an attitude of “what can we do better in an on-line learning environment than we did in person”? As a result, an 8-wk integrative project was offered to the class of 142 students.

In effort to make and sustain a viable learning community, instead of three 180-min laboratory sessions, we offered 6 90-min laboratory sessions with 20 to 25 students per session. The students in each session were further divided into groups of 3 to 4 which resulted in a total of 36 groups. Students were tasked with developing a virtual farm (The Game of Farm Life). Eight weekly assignments, submitted for grading as 3 PowerPoint slides were based on themes of farming (farm description, provincial and national industry size, feeding, breeding, marketing, technology, emergency management and production efficiency). To provide actual Alberta farm industry exposure, each week six different Alberta animal producers provided virtual farm tours (48 farmers in total). Students had 30 to 45 min to ask questions and discuss their own farm plans with the farmers. All farmer presentations were recorded and were made available to all students (including those in other lab sections) to watch.

Student Response Surveys The objective of the project reported here was to ascertain student perceptions of the above 8-wk project. All surveys were approved by a

University of Alberta Human Ethics Board. Students were polled nine times during the project, beginning on the day the project was launched (week 0) and subsequently at 7-d intervals. All surveys were carried out using Qualtrics in an online forum. The survey consisted of 5 statements to which students could select one of 5 responses (1:strongly disagree, 2: disagree, 3: neutral, 4: agree or 5: strongly agree). The statements are presented in Table 1.

Overall, at least 98 students responded to each weekly survey. There were no significant changes in student responses to each of the 5 questions over the 9 surveys. The composite value (mean of nine weekly surveys) is shown below based on the 5-point Likert response to each of the 5 statements (Table 2). This observation was considered to be very positive, as students showed very favorable responses initially, and they did not change significantly throughout the following project surveys.

Overall, the weekly student surveys suggested high levels of student engagement and satisfaction. Conversations with the farmer guests indicated that they were without exception, highly appreciative of the opportunity to share their stories and discuss current issues they were facing. While on-line virtual tours lack some of the sensory attributes that students value, the online tours made it possible to showcase more farms representing a wider view of the Alberta animal industry. These tours did not incur transportation costs and took less student time than did in-person tours. This format was modified and re-used in the same course in 2022.

SECTION 4: THE SCHOLARSHIP OF TEACHING AND LEARNING IN THE PROMOTION AND TENURE PROCESS

Todd Applegate

While many universities have broadened opportunities for faculty to develop their scholarship in teaching, means to recognize and evaluate this excellence in promotion and tenure dossiers has substantially lagged, and is inconsistently defined across institutions. Having often been asked to be an external evaluator for promotion of candidates, there is a broad range of guidance across institutions, ranging from me having to request prior courses a faculty candidate had taught, to another

Table 1. Survey statements.

Statement #	Survey Response Statement
1	I feel enthusiastic about the Game of Farm Life 2.0 project today
2	I feel that I was part of a helpful online learning community in the lab session this week
3	The community formed in my AN SC 101 lab is helping me stay engaged and motivated during this online term
4	I feel like I am getting sufficient guidance and help from the AN SC 101 teaching team in working on my Game of Farm Life project today
5	I am enjoying AN SC 101 more than other online classes I am taking this term

Table 2. Student responses to five survey statements.

Wk	Statement #									
	1		2		3		4		5	
	Mean Value	SEM	Mean Value	SEM	Mean Value	SEM	Mean Value	SEM	Mean Value	SEM
0	4.05	0.20	4.02	0.20	3.78	0.20	4.06	0.20	4.07	0.21
1	3.95	0.20	3.90	0.20	3.82	0.20	4.02	0.20	4.03	0.21
2	4.04	0.19	3.92	0.19	3.91	0.19	4.05	0.19	3.95	0.19
3	3.90	0.19	3.85	0.20	3.73	0.19	4.00	0.20	4.00	0.20
4	4.05	0.19	3.99	0.19	3.97	0.19	4.17	0.20	4.00	0.20
5	4.13	0.19	3.94	0.19	3.90	0.19	4.12	0.20	4.11	0.20
6	4.14	0.19	3.98	0.19	3.98	0.19	4.09	0.19	3.91	0.19
7	4.19	0.20	4.00	0.19	4.11	0.19	4.24	0.20	4.09	0.20
8	4.20	0.20	3.95	0.19	4.05	0.19	4.16	0.19	4.06	0.20

with a teaching portfolio comprised of student, peer, and institutional (e.g., Centers of Teaching and Learning Specialist) evaluations, narratives of effective positioning of learning outcomes into the course and reflection on inclusive pedagogical approaches to reach a broad student demographic.

Assessment of Teaching Effectiveness Teaching portfolios, fortunately, are becoming more commonplace, as debate on student end of class evaluations alone as scholarship of teaching evidence were questioned in the 1990s for their independence, bias, and subjectivity. [Hornstein \(2017\)](#) outlined several prior publications outlining issues with student evaluations of teaching in the literature, including: validity, reliability, and gender bias, to name a few. While [Hornstein \(2017\)](#) relays the original intent of student evaluations to be formative to improve and shape the quality of teaching, they often are (and in many cases are still) the primary evidentiary means of teaching effectiveness in promotion dossiers. Further confounding the validity of student evaluations, many have moved the evaluations from an in-person to an on-line collection means, further reducing the sample size (e.g., [Donmeyer et al., 2004](#) noting an average return rate of 70% for in-class surveys to 29% on-line). [Stark and Freishtat \(2014\)](#) summarizes this well, “We don’t measure teaching effectiveness. We measure what students say and pretend it’s the same thing. We calculate statistics, report numbers, and call it a day.”

Measuring teaching effectiveness is inherently difficult. Student evaluations, while a tool, have been a relatively easy means to do so. However, we have lacked contextualization of responses and inherently reduced evaluations to averages (something we as scientists should know better to do for ordinal categorical data). Thus, [Stark and Freishtat \(2014\)](#) provided the following recommendations to improve incorporation of student evaluations into assessment of teaching effectiveness:

- (1) Drop omnibus items about “overall teaching effectiveness” and “value of the course” from teaching evaluations: They are misleading.
- (2) Do not average or compare averages of student rating scores: Such averages do not make sense statistically. Instead, report the distribution of scores, along with the number of responders and the response rate.

- (3) Pay careful attention to student comments—but understand their scope and limitations. Students are the authorities on their experiences in class, but typically are not well situated to evaluate pedagogy generally.
- (4) Use caution extrapolating student evaluations to the entire class. When response rates are low, extrapolation is unreliable
- (5) Avoid comparing teaching in courses of different types, levels, sizes, functions, or disciplines.
- (6) Use teaching portfolios as part of the review process. Teaching portfolios may include peer, student, and institutional evaluations, narratives of effective positioning of learning outcomes into the course and reflection on inclusive pedagogical approaches to reach a broad student demographic.
- (7) Use classroom observation as part of milestone reviews.
- (8) To improve teaching and evaluate teaching fairly and honestly, spend more time observing the teaching and looking at teaching materials.

Development of the Scholarship of Teaching and Learning Portfolio

Since 2000, institutions began requiring multiple sources of evidence of teaching excellence, inclusive of more than one component of the aforementioned teaching portfolio. Fast forward to today, the conversation has matured beyond that of the teaching popularity contest (with students and/or peers) to include evidentiary measures of contribution of the candidate to course student learning outcomes (**SLO**), as well as positioning of the course(s) into curricular SLO (and desire/flexibility to alter pedagogy and/or approaches to course SLO).

When it comes to the breadth of evidence of teaching effectiveness, university promotion and tenure guidelines have attempted to incorporate the SLO portfolio approach generically in order to encompass the breadth of disciplines within the institution. At the University of Georgia, we currently require at least 2 forms of evidence of teaching effectiveness, including: end of course surveys, alumni surveys, letters of support, graduate student mentorship, supervision of independent studies, systemic observations by peers trained in measures of effective teaching, accreditation program participation, development of teaching programs

and/or courses, work on curricula, honors for teaching, publications and/or presentations on teaching, competitive grants to fund innovative evidence-based educational activities, and/or teaching governance/committee involvement.

More recently, some institutional guidance for promotion has trended to require the inclusion of evidence of fostering student success outside of the classroom. This has become a point of much discussion, as on one hand, how can you hold an individual faculty responsible for the success or failure of a program. Thus, documentation for evaluation, rather has turned to evidence of involvement in activities which have demonstrated impact on individual student success. Likely this documentation of effectiveness/impact will also evolve. Currently, however, evidence will need to move beyond an accounting effort in participation/initiation of programmatic effort. For example, not only mentoring students in research, but having those students receive competitive awards.

Overall, universities need to continue to engage in discussions related to scholarship of teaching and learning. This will include broadening opportunities for faculty to develop their teaching programs. With this also comes the need to discuss how faculty can better illustrate and document their teaching effectiveness.

SYMPOSIUM CONCLUSION

SOTL offers an opportunity for excellent teachers to engage in systematic inquiry of teaching practices. Results can provide evidence to determine pedagogical changes that can be made in the classroom, but also be disseminated to a broader audience. SOTL researchers in animal and poultry science can contribute to the body of knowledge guiding teaching practices across the discipline. Educators' contribution can be highlighted in promotion and tenure documents as well as through the development of course portfolios. Moving forward, we must continue to explore best practices in our programs that will result in students meeting course learning outcomes and increase student curiosity and engagement. This will provide an increased workforce of career-ready students ready to take on the challenge of feeding a growing population.

DISCLOSURES

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