A Proposal to Quantify the Awareness and Use of Experiential Learning in Wildlife/Fisheries Curricula in the United States

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Introduction

Experiential Learning

The broad definition in literature says that experiential learning is "learning by doing", but that is not all that experiential learning is (Abdreasen, 2004). Experiential learning is a process by which new knowledge is gained via the transformation of knowledge through experience (Kolb and Kolb, 2005; Healey and Jenkins, 2000). The pinnacle work on experiential learning is Kolb (1984), in which he explained his experiential learning theory, which is based on John Dewey's work in 1936, Kurt Lewin's work in 1951, and Jean Piaget's work in 1971 (Andreasen, 2004). Since 1984, Kolb has revisited and enhanced his original theory with many other works surrounding experiential learning.

There are four components to Kolb's (1984) model of experiential learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Fig 1) (Andreasen, 2004). In addition to four stages in Kolb's model, there are two axes. In Kolb's model, vertical axis is knowledge acquisition and horizontal axis is transformation of information. On the knowledge axis, apprehension is tangible whereas comprehension is conceptual. On the transformation axis, extension is actively testing whereas intention is internal reflection (Andreasen, 2004; Corbett, 2005). The combination of axes and stages of the model produce distinct learning styles as proposed by Kolb and Kolb (2005). The four learning styles

are the converger, the diverger, the assimilator, and the accommodator. More information on these learning styles can be found in Kolb and Kolb (2005) and Corbett (2005).

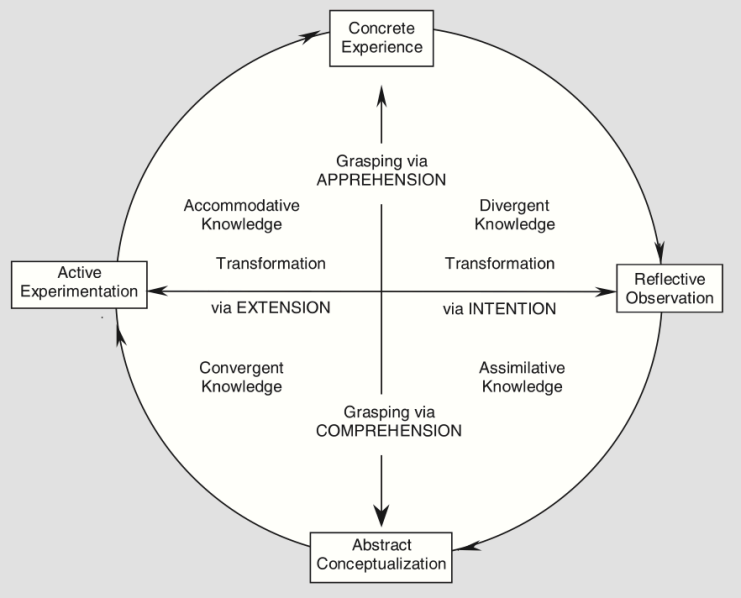

Figure 1. Kolb's model for experiential learning as presented in Andreasen (2004).

There are many ways to implement experiential learning into university level courses. This may include field based or classroom-based activities such as role-playing, computer simulations, internships, practicums, group projects, or debates (Hamer, 2000). Additionally, experiential learning is employed across many different disciplines although some disciplines may be easier to implement experiential learning opportunities (Cantor, 1997). Many pieces of literature focus on case studies (Andreasen, 2004; Cantor, 1997; Corbett, 2005; Hamer, 2000; Healey and Jenkins, 2000) using experiential learning in the classroom and can be easily found through a literature search.

As for its usefulness and efficacy, Andreasen (2004) quoted the 1991 Secretary's Commission on Achieving Necessary Skills (SCANS) Executive Summary Report saying, "We believe, after examining the findings... that the most effective way of learning skills is 'in context'

and placing learning objectives within a real environment..." (p. xv)." Additionally, the National Council on Agricultural Education (1996) says that its aims to enhance education through experiential learning. Researchers are reporting that experiential learning is necessary for universities to utilize because it adds variety in education style for non-traditional learners; it helps with recruitment, retention, and recovery; gives students competitive edges for graduate schools and jobs; and increases the knowledge retained over traditional instructional delivery methods (Cantor, 1997; Hamer, 2000).

In 1985 the Association of American College was worried about the quality of colleges and universities (Andreasen, 2004). However, there is no shortage of literature supporting the need for and use of experiential learning in university level courses. Ultimately, the gap lies with awareness and implementation.

Wildlife and Fisheries Sciences

Wildlife conservation was not established as a field until Aldo Leopold became the first professor of wildlife in 1933 (Bleich and Oehler Sr, 2000). Although the original focus of the field was the production of game animals, the field of wildlife management has shifted to include research and management from a holistic ecosystem approach (Bleich and Oehler Sr, 2000). Currently, there are at least 137 schools across 44 states with titled or non-titled degrees related to the studies wildlife, fisheries, and their conservation (Kelso and Murphy, 1988). It is important to note that the only uniformity across these programs exists in certifications by national societies such as The Wildlife Society and the American Fisheries Societies, which have categorical credit hour requirements (Edge and Sanchez, 2011; Bleich and Oehler Sr, 2000).

Herein the collective study of wildlife, fisheries and conservation sciences will be referred to as wildlife.

There are two challenges that university educators face today in wildlife programs. The first challenge is related to knowledge, that is, what students need to learn and how they learn it. The need and responsibility of wildlife conservationists is becoming increasingly complex (Ryan and Campa Iii, 2000). "These challenges will require a strong knowledge base in ecology and natural resource management principles, career-long learning of new concepts and techniques, and the ability to readily adapt to new conservation paradigms" (Ryan and Campa Iii, 2000). Other researchers say that this is a lack of "basic familiarity" with nature and a "decline in natural history training" (Bleich and Oehler Sr, 2000). There is a breadth and depth of knowledge that is needed by future scientists and conservationists that needs to be balanced (McCleery and others 2005; Matter and Steidl, 2000; Millenbah and Millspaugh, 2003). Overall, students need to be able to employ higher order thinking (Kessler, 1995; Mattingly, 1997; Ryan and Campa Iii, 2000).

Related to the amount of material students needs to know, there is the issue of how students are being taught. In the early 2000s, wildlife educators saw the need to increase experiential learning in undergraduate courses (McCleery et al., 2005). In 2009, the use of active learning was still considered new (Hiller and Tyre, 2009). Due to the diverse knowledge asked of students, there is no "ideal curriculum" for wildlife students (Matter and Steidl, 2000). At one point, this began a division between the learning of facts and critical thinking (Matter and Steidl, 2000).

The second challenge faced by university educators goes beyond the knowledge required at universities to produce mature, scientifically literate students, but the skills employers are

looking for upon graduation. So far, universities have done a good job creating entry level technicians (Bleich and Oehler Sr, 2000). Hands on skills always fascinate students because many enter the major anticipating working with animals and being outside (Fedynich and others 2012; Bleich and Oehler Sr, 2000). However, employers also want students to have leadership, communication, and people skills in addition to strong analytical skills (Kessler, 1995; Montgomery and Millenbah, 2011; Stevenson and Peterson, 2015). University programs have been criticized in the literature for not creating "integrated thinkers" (Kessler, 1995). However, this is strong evidence that experiential learning can help meet these needs (Mattingly, 1997; Sims, 1995).

Experiential learning is an exemplary teaching pedagogy for wildlife curricula. Experiential learning puts students in "direct contact with concepts being studied" (Millenbah and Millspaugh, 2003). The learning of real-world scenarios in an active, hand-on, and applied manner (Fedynich et al., 2012; Montgomery and Millenbah, 2011; Hiller and Tyre, 2009) "links scholarship, ideas and actions" (Fedynich et al., 2012). Additionally, the literature shows that experiential learning increases the retention and maintenance of knowledge (Fedynich et al., 2012; McCleery et al., 2005; Millenbah and Millspaugh, 2003; Montgomery and Millenbah, 2011). Overall, experiential learning improves overall scholarship by occasionally occurring spontaneously (Fedynich et al., 2012), increasing enthusiasm (Millenbah and Millspaugh, 2003), increasing motivation (Millenbah and Millspaugh, 2003) and continually proving to be "fundamental to meaningful learning" (McCleery, 2015; McCleery et al., 2005; Millenbah and Millspaugh, 2003). Experiential learning solves a variety of the challenges university instructors and potential employers face.

Literature on university wildlife education lists at least 15 different types of activities that qualify as experiential learning. The most common type of experiential learning appears to be in the form of field based courses. Although a challenge to implement due to time and budgets, they also appear to be the most rewarding (Hirsch and Lloyd, 2005; McCleery et al., 2005; Millenbah and Millspaugh, 2003; Powell and others 2009). Some faculty meet their own research needs as well as the needs of their students by completing on campus research for students in which students partake (Fedynich et al., 2012; McCleery et al., 2005; Millspaugh and Millenbah, 2004; Powell et al., 2009). Other faculty use classroom based approaches such as role-playing, discussions, reflective activities, and simulation games to allow students to have experiential learning opportunities ((Fedynich et al., 2012; Hiller and Tyre, 2009; Hirsch and Lloyd, 2005; Mattingly, 1997). Lastly, study aboard opportunities allow for a global perspective found valuable by a recent push for global awareness. (McCleery et al., 2005; McLaughlin and Johnson, 2006; Powell et al., 2009).

The small literature base for wildlife education provides an array of examples experiential learning. Therefore, the literature proves that experiential learning is a powerful tool to wildlife educators, but the literature also supports the need for more experiential learning in university level courses to build better natural resource professionals.

The Need

As a profession, we cannot gauge the improvements we have made in preparing students for careers in a natural resources without knowing the current status of the wildlife and fisheries curriculum across the United States. To date, no one has quantified the instructional methods employed by faculty in these programs. Last year, Stevenson and Peterson (2015) noted that there has been a "lack of effort" to evaluate experiential education in wildlife education. Therefore, it is imperative be establish a baseline measure of experiential learning before congratulating ourselves on a future improvements.

Methods

A survey is likely the most effective way to collect the desired data. First, a survey would be sent to determine awareness of experiential learning pedagogy (Appendix A). It is possible that it is being employed, but instructors may be unaware of its place in teaching pedagogy. The second survey would assess the use of experiential learning pedagogy (Appendix B). The Wildlife Society Working Group on College and University Wildlife Education would be a useful resource for knowing who to distribute materials to.

Review by the Institutional Review Board for Human Subject Research would likely change the content of the following proposed surveys. Statistical analysis may include linear regression and ANOVA methods. This work could then be published in the North American Colleges and Teachers of Agriculture Journal.

References

Andreasen, R. J. 2004. Integrating experiential learning into college of agriculture capstone courses: Implications and applications for practitioners. NACTA journal 48(1):52-57.

Bleich, V. C. and M. W. Oehler Sr. 2000. Wildlife education in the United States: thoughts from agency biologists. Wildlife Society Bulletin 28(3):542-545.

Cantor, J. A. 1997. Experiential Learning in Higher Education: Linking Classroom and Community. ERIC Digest.

Corbett, A. C. 2005. Experiential learning within the process of opportunity identification and exploitation. Entrepreneurship Theory and Practice 29(4):473-491.

Edge, W. D. and D. Sanchez. 2011. An online Fisheries and Wildlife degree: Can you really do that? Wildlife Society Bulletin 35(1):2-8.

Fedynich, L. V., D. Doan-Crider and A. Fedynich. 2012. Undergraduate experiential learning in the natural sciences at a Hispanic serving institution. Research in Higher Education Journal 15:1.

Hamer, L. O. 2000. The additive effects of semistructured classroom activities on student learning: An application of classroom-based experiential learning techniques. Journal of Marketing Education 22(1):25-34.

Healey, M. and A. Jenkins. 2000. Kolb's experiential learning theory and its application in geography in higher education. Journal of geography 99(5):185-195.

Hiller, T. L. and A. J. Tyre. 2009. Investigating Active-Learning Strategies in Wildlife Ecology College Courses1. NACTA Journal.

Hirsch, P. and K. Lloyd. 2005. Real and virtual experiential learning on the Mekong: Field schools, e-sims and cultural challenge. Journal of Geography in Higher Education 29(3):321-337.

Kelso, W. E. and B. R. Murphy. 1988. University fisheries programs in the United States: structure and needs. Fisheries 13(2):9-15.

Kessler, W. B. 1995. Wanted: A new generation of environmental problem-solvers. Wildlife Society Bulletin (1973-2006) 23(4):594-599.

Kolb, A. Y. and D. A. Kolb. 2005. Learning styles and learning spaces: Enhancing experiential learning in higher education. Academy of management learning & education 4(2):193-212.

Kolb, D. A. 1984. Experiential Learning: Experience as the Source of Learning and Development. Prentice-Hall, Englewood Cliffs, New Jersey.

Matter, W. J. and R. J. Steidl. 2000. University undergraduate curricula in wildlife: beyond 2000. Wildlife Society Bulletin 28(3):503-507.

Mattingly, H. T. 1997. Seeking balance in higher education. Conservation biology 11(5):1049-1052.

McCleery, R. 2015. Teaching wildlife techniques to millennials with a flipped classroom. Wildlife Society Bulletin 39(4):822-826.

McCleery, R. A., R. R. Lopez, L. A. Harveson, N. J. Silvy and R. D. Slack. 2005. Integrating on-campus wildlife research projects into the wildlife curriculum. Wildlife Society Bulletin 33(3):802-809.

McLaughlin, J. S. and D. K. Johnson. 2006. Assessing the Field Course Experiential Learning Model: Transforming Collegiate Short-Term Study Abroad Experiences into Rich Learning Environments. Frontiers: The Interdisciplinary Journal of Study Abroad 13:65-85.

Millenbah, K. F. and J. J. Millspaugh. 2003. Using experiential learning in wildlife courses to improve retention, problem solving, and decision-making. Wildlife Society Bulletin:127-137.

Millspaugh, J. J. and K. F. Millenbah. 2004. Value and structure of research experiences for undergraduate wildlife students. Wildlife Society Bulletin 32(4):1185-1194.

Montgomery, R. A. and K. F. Millenbah. 2011. Examining whether learning space affects the retention of experiential knowledge. Journal of Natural Resources & Life Sciences Education 40(1):45-50.

Powell, L. A., A. J. Tyre, S. E. Hygnstrom, D. A. Wedin, P. R. Hanson, M. S. Kuzila and J. B. Swinehart. 2009. Wilderness Serendipity: Planning and Assessing Learning during an Experiential Field Course.

Ryan, M. R. and H. Campa Iii. 2000. Application of learner-based teaching innovations to enhance education in wildlife conservation. Wildlife Society Bulletin:168-179.

Sims, S. J. 1995. Experiential Learning: Preparing Students to Move from the Classroom to the Work. The Importance of Learning Styles: Understanding the Implications for Learning, Course Design, and Education (64):147.

Stevenson, K. T. and M. N. Peterson. 2015. How experiential service-learning affects student perceptions of education in their careers and as a wildlife management activity. Wildlife Society Bulletin 39(4):732-737.

Appendix A: Awareness Survey

1a. Do you know what Kolb's Model is? (circle one)
Yes No I prefer not to answer

1b. Do you use Kolb's Model in your classroom? (circle one)
Yes No I prefer not to answer

2a. If no to question 1, do you know what experiential learning is? (circle one)
Yes No I prefer not to answer

2b. If no to question 1, do you use experiential learning in your classroom? (circle one)
Yes No I prefer not to answer

3. If no to question 2, please check any of the following instructional methods used in your class(es).

□ Problem cases
□ Guest Speakers
□ Written or oral reports
□ Individual or group projects
□ Field journals
□ Service learning
□ Online tutorials
□ Lecture
□ Videos
□ Readings
□ Games
□ Trips
□ Group research and teamwork
□ Debates/discussion
□ Role-playing
□ Laboratories

4. Do any of your class activities or assignment include (check all that apply):
□ Reflecting
□ Sharing
□ Generalizing Concepts
□ Application of knowledge

5. What does experiential learning mean to you? _____

Appendix B: Use of Experiential Learning Survey

Course Code:
Course Title:
Course Description:

Is this course required for the wildlife sciences related major offered? (circle one)
Yes No I don't know

In what semester is this course typically taken? (circle one)
1st 2nd 3rd 4th 5th 6th 7th 8th Other Does not apply

In what semester is this course offered? (circle one)
Fall Spring Fall and Spring Summer

Does your course include opportunities for experiential learning? (circle one)
Yes No I don't know

If **yes**, please check all categories of experiential learning that apply. Please include the number of hours spent on each type of activity in the space to the right.

□ Problem cases _____
□ Field journals _____
□ Service learning _____
□ Games _____
□ Trips _____
□ Group research and teamwork _____
□ Debates/discussion _____
□ Role-playing _____
□ Laboratories _____
□ Other: _____ _____

If yes, which of the following best describes the majority of you experiential learning time.
In class Out of class 50:50 in/out I don't know

If **no**, please select all methods of instructional that you use.

□ Lecture
□ Videos
□ Readings
□ Guest Speakers
□ Written or oral reports
□ Individual or group projects
□ Online tutorials
□ Other: _____