

Using an Experiential Learning Design to Teach Photography in Agricultural Communications

As undergraduate agricultural communications programs seek to develop students' understanding of photography, visual literacy, and basic camera functions in their curriculum, the need develops for the identification of effective and creative instruction methods, including experiential learning activities. While much of the literature in the field of agricultural communications focuses on photography as a piece of the core curriculum, few studies have examined instruction strategies for teaching photography.

Photography is an important visual communication skill in agricultural communications. The ability to capture and communicate agricultural practices through photography and visual imagery can clarify scientific concepts, production practices, and technologies that are often a concern to public audiences. The use of photographic images in agriculture not only documents our history and technological advances, but it can also be used to explain and demystify agricultural practices and techniques. Therefore, there is a need to strengthen photography pedagogy to prepare modern agricultural communicators who can create and apply visuals that engage the public in scientific conversations.

The Department of Agricultural Education and Communications at Texas Tech University offers a digital photography course twice a year in its agricultural communications curriculum: once during the traditional spring semester format and once during the 12-day "intersession" between the spring and summer semesters. During the traditional spring semester, photography principles are taught in the classroom during the Tuesday-Thursday, hour and 20-minute class sessions. Students in this semester format have to experiment with their cameras and complete assignments on their own time outside of the classroom. These time constraints within a single semester often pose challenges for instructors of basic photography courses who have multiple learning outcomes to achieve in the limited period (Abrahmov & Ronen, 2008). Additionally, for traditional face-to-face photography course models, the limited amount of class time with students can present challenges to teachers who want to reinforce what students learned during their outside-of-class experiences (Rand, Stevens, & Horner, 2015).

The intersession section of the digital photography course uses an experiential structure. The nature of the two-week intersession allows for lengthier class periods and flexibility in how and where the course is taught. After a few brief hours in the classroom learning about exposure basics, intersession class time is spent traveling to farms, ranches, a feedlot, and outdoor locations where students can photograph agricultural subjects and receive on-site coaching from the instructor as they complete their assignments. These field experiences typically occur within day trips to locations in West Texas within a 200-mile radius of the Texas Tech University campus in Lubbock, Texas.

This study compared student performance in an agricultural communications digital photography course taught in two instructional formats in 2016 and 2017. Course curriculum in both formats addressed photography basics, including exposure and composition as well as managing digital images and understanding digital SLR camera functions. Both course formats used the same learning outcomes, which were taught using practical class activities, photography assignments, in-class critiques of assignments, and a final online portfolio.

Literature Review

Photography Instruction

Photography is a common core skill taught in undergraduate agricultural communications curriculum (Terry, Lockaby, & Bailey-Evans, 1995) and is considered by industry professionals to be an important skill for graduates of agricultural communications programs (Terry & Bailey-Evans, 1995; Irlbeck & Akers, 2009; Morgan, 2010). Understanding of photography and camera functions are also considered valued competencies by both agricultural communications alumni (Morgan, 2012) and faculty members (Morgan, 2013).

From the broad perspective of photography instruction, the literature places an emphasis on teaching composition and an appreciation for light (Perkis, 2005; Killen, 2006; Rand & Zakia, 2006; Partin-Harding, 2011; Foster, 2012). Undergraduate photography courses in agricultural communications focus on teaching basic skills, including composition, camera functions, proper lighting, black and white, and color photography (Terry et al., 1995). Partin-Harding (2011) suggests using quantitative measures to reflect students' understanding of photography proficiencies, including composition, color, light, and portfolio development. Bogre (2014) says once undergraduate students learn the basic skills, photography teaches them to think critically, independently, and creatively. Because photography has been identified as a needed competency of agricultural communications graduates, further exploration of effective photography instruction methods is needed.

Experiential Learning Theory

This study was conducted through the scope of Kolb's Theory of Experiential Learning (1984), which states, "knowledge is created through the transformation of experience" (p. 41). Previous research in both agricultural communications and photography instruction in higher education indicates the use of experiential practices. Commonplace in colleges of agriculture, including agricultural communications (Roberts, 2006), the use of experiential instruction methods in photography encourage students to fulfill course learning objectives through hands-on practice, which results in photography skill improvement (Horner, 2016).

Experiential learning is based on the "learn by doing" concept. Way (2006) recommends "students learn photography best by doing it" (p. 7). Basic photography classes require active participation from students as they apply what they learn, especially when it comes to learning how to operate their cameras (Horner, 2016). The use of high-level, active engagement, hands-on practice, and reflective sessions help effectively build visual skills and reinforce topics in the curriculum (Rand et al., 2015). Such personal experiences provide the "focal point for learning, giving life, texture, and subjective personal meaning to abstract concepts" (Kolb, 1984, p. 21).

Experiential learning activities can be implemented in a photography course through specific assignments (Rand, et al., 2015). Way (2006) suggests hands-on learning should be part of every class session, while Baker, Robinson, and Kolb (2012) recommend experiences in agricultural education should be goal-oriented and measurable.

Within Kolb's experiential learning theory, a four-staged cycle outlines when significant learning occurs: concrete experiences, reflective observation, abstract conceptualization and active experimentation. "The study of photography can clearly be understood as stages of an experiential learning process" (Horner, 2016, p. 81). The cycle can be entered by the learner at any point. Concrete experience takes place when the learner has an experience; reflective observation involves reviewing and/or reflecting on the experience; abstract conceptualization occurs when the

learner makes conclusions from the experience; and active experimentation takes place when the learner plans or tries out what they learned (Kolb, 1984; McLeod, 2017).

Horner (2016) provided examples of how a photography class can utilize Kolb's (1984) four-stage experiential learning cycle. This study focused on the concrete experience stage of the learning cycle.

Concrete Experience

The concrete experience stage introduces new concepts through new experiences (Andreason, 2004). In this stage, learners grasp new information through experiencing the “tangible, felt qualities of the world, relying on our senses and immersing ourselves in concrete reality” (Kolb, Boyatzis, & Mainemelis, 2001, p. 3). Within the context of photography instruction, Horner (2016) describes an in-depth relationship between photography and concrete experience and suggests students learn from both their own experiences, the experiences of their peers, as well as from professional guest speakers. Class trips allow students to “explore, discover, and photograph unfamiliar surroundings” (p. 85). Additionally, instructors are able to coach students in the field as they are shooting for assignments.

To improve learning, students should be engaged in a process that facilitates optimal learning, which includes providing feedback to students as they implement learning outcomes (Baker, et al., 2012). In terms of locality, Horner (2016) says students benefit by leaving their familiar boundaries of the campus and photographing subjects in unfamiliar places, especially out of state or abroad. This model of travel-based instruction, which is usually seen in study abroad and study away programs, has shown value in the educational experiences of agricultural communications students (Bobbitt & Akers, 2012; Meyers & Arnold, 2016). Travel- or location-based courses can provide high-impact concrete experiential learning for photography students (Homeyer, Leggette, McKim & Walker, 2017). Such unfamiliar locations can provide a laboratory for learning photography. Additionally, Horner (2016) recommends encouraging students to research destinations and to play the role of a travel photographer to prepare for the learning experience. “With all the research on the transformative power of the study abroad experience, it seems a natural fit for photography students” (Horner, 2016, p. 85).

Rand and Zakia (2006) said while classroom lecture provides background and knowledge on photography topics, it is in the lab where techniques are perfected. Whether the laboratory is a darkroom or in the field, “the instructor’s role is to interact with the learners to assure that the steps of the technique are properly executed” (p. 65). Such experience as a photographer helps develop one’s ability and style (Foster, 2012). The use of travel-based, on-location lecture and demonstrations are practical for helping learners understand new photography concepts and how to use equipment (Rand, et al., 2015). Based on Kolb’s (1984) experiential learning theory, this on-location, field-based instruction method facilitates student learning and understanding of core photography principles.

Purpose and Research Questions

The purpose of this study was to compare student performance in an agricultural communications digital photography course taught with an experiential learning approach to a traditional classroom approach. The following research questions guided this study:

1. Is there a statistically significant difference between the cumulative mean scores by instructional format?
2. Is there a statistically significant difference between the individual assignment mean scores by instructional format?
3. Is there a statistically significant difference between the rubric criteria mean scores by instructional format?

Methods

This quasi-experimental study evaluated student performance (dependent variable) in an agricultural communications digital photography course taught in two instructional formats (independent variable). Independent samples t-tests were used to compare student performance in a traditional spring semester format and a 12-day experiential summer intersession semester format in 2016 and 2017. This study was exempt by the Human Subjects Review Board.

The population of this study was 81 students enrolled in an agricultural communications digital photography course during four semesters: spring 2016, summer 2016, spring 2017, and summer 2017. Of the 81 analyzed cases used in the study, 70 were female and 11 were male. Data were collected from consenting students' seven graded photography assignment rubrics in the traditional semesters ($n = 54$) and experiential intersession semesters ($n = 27$). Assignments used in all course formats included Light, Depth of Field, Action, Color, Black and White, Editorial, and Portrait. Six of the seven assignments were worth 25 total points with five rubric criteria worth five points each. Because of additional assignment requirements, one of the assignments, Portrait, was worth 50 total points with five rubric criteria worth 10 points each.

For each assignment, students submitted three images. The same rubric was used to grade all course assignments in both formats (Figure 1). Five rubric criteria were used to evaluate composition, clarity, creativity, artistic expression, and overall requirements. Each criterion was graded on four levels: exemplary performance (5 points), at or above average performance (3-4 points), below average performance (2 points), and low performance (0-1 points).

Cases where outliers existed, including when students did not turn in an assignment or received total assignment score point deductions because of incomplete assignment submissions, were completely removed from the dataset. All data collected from students came from course-related activities and occurred during the normal class time.

Using SPSS statistics software, independent-samples t-tests were used to compare instructional format by cumulative mean scores, individual assignment mean scores, and rubric criteria mean scores. Normality of data distribution in groups was assessed using the Shapiro-Wilk test. Homogeneity of variance was assessed by Levene's Test for Equality of Variances. Cohen's d coefficient was used for analysis of effect size in the comparisons.

ACOM 2303 Assignment Grading Rubric

Author:

Assignment:

Objectives	Exemplary Performance (5 points)	At or Above Average (3-4 points)	At or Below Average (2 points)	Low Performance (0-1 point)	Points Earned
Composition (5 points)	Strong composition. Images are strong because of layout and placement of camera to subject.	Good composition but images could be improved with better layout and placement of camera to subject.	Image composition is average, but other angles, focal lengths and positioning of subjects will be needed.	Images are shot in a plain manner, distracting from composition and leaving image stagnant. Backgrounds are busy or distract from focus of the image.	0
Clarity (Exposure, DOF, & Focus) (5 points)	Subject is in focus. Depth of field compliments subject. Image is properly exposed (lighting, color, levels).	Subject is in focus. Depth of field is somewhat complimentary to subject. Slight sharpening could improve quality and effectiveness of image. Image is somewhat properly exposed.	Subject is partially in focus. Depth of field does not compliment subject. Image exposure needs improvement.	Subject is not in focus. Depth of field does not compliment subject. Image is not properly exposed.	0
Creativity (5 points)	Elements within the imagery have purpose. Imagery shows direction. Imagery is personal and revealing.	Elements within the imagery have purpose but more direction and personal reflection is needed.	Imagery shows little direction or purpose. Imagery shows little personal reflection. Imagery shows some forethought.	Imagery shows no direction and lacks purpose. Imagery shows no personal reflection. Imagery shows no forethought.	0
Artistic Expression (5 points)	Image collection exhibits aesthetic content that represents or illustrates a complex, symbolic expression which creates an illuminating experience in the viewer.	Ideas for images and satisfying assignment are there, but the execution needs improvement.	Student needs to further polish representation of aesthetic content in order to accomplish the goal of the assignment.	Exhibits limited skills to process symbolic relationships and being able to communicate a story through graphical images.	0
Overall Assignment (5 points)	Each image meets the requirements and expectations outlined by the assignment.	The image collection somewhat meets the requirements and expectations of the assignment, but some minor improvements are needed.	Image collection lacks the requirements and elements outlined by the assignment. Several improvements are needed.	The image collection does not meet the assignment requirements or expectations. Overall quality of the submission is poor.	0
Comments				Subtotal	0
FATAL FLAWS:					
_____ Missing images (-10 points per missing image)					
_____ Photo shot by someone else or for another course (automatic 100% deduction)					Deduction?
					0
Total Points (25 possible)					0

Figure 1: ACOM 2303 Assignment Grading Rubric Used in Both Formats

Results

Research Question 1: Is there a statistically significant difference between the cumulative mean scores by semester format?

This study found students in the experiential format had statistically significantly higher mean cumulative assignment scores ($M = 184.52$, $SD = 7.14$) compared to students in the traditional course ($M = 174.93$, $SD = 9.91$), $t(79) = -4.48$, $p < .01$. Cohen's d effect size ($d = 1.11$) showed a very large effect, which suggests overall an experiential format has a positive impact on student performance in a photography course.

Research Question 2: Is there a statistically significant difference between the individual assignment mean scores by semester format?

Of the seven assignments in the course, students in the experiential format had statistically significant higher mean scores on the Depth of Field, Action, and Portrait individual assignments than students in the traditional format (Table 1).

On the Depth of Field assignment, students scored significantly higher in the experiential format ($M = 23.11$, $SD = 1.70$) than in the traditional format ($M = 22.67$, $SD = 1.80$), $t(79) = -4.40$, $p < .01$. The effect size for this analysis ($d = .25$) was found to show a low effect. Students scored statistically significantly higher scores on the Action assignment in the experiential format ($M =$

22.48, $SD = 1.53$) compared to the traditional format ($M = 21.41$, $SD = 2.37$) $t(79) = -2.14$, $p = 0.04$. The effect size for this analysis ($d = .54$) was found to show a medium effect. On the Portrait assignment, which was the only assignment that used a 50-point grading scale, students in the experiential format ($M = 46.07$, $SD = 2.67$) scored significantly higher than students in the traditional format ($M = 44.46$, $SD = 3.45$), $t(79) = -2.13$, $p = .04$. The effect size for this analysis ($d = .52$) was found to show a medium effect. The low to medium effect sizes of these three assignments indicate experiential learning activities do have an effect on student performance. No statistically significant differences in student individual assignment mean scores were found in the Light, Color, Black and White, or Editorial assignments when comparing the two groups.

Table 1.

Significant Comparisons of Students' Individual Assignment Mean Scores by Instruction Method

Variable	Traditional ($n = 54$)		Experiential ($n = 27$)		t	df	p	Cohen's d
	M	SD	M	SD				
Depth of Field	22.67	1.80	23.11	1.70	-4.40	79	<.01	.25
Action	21.41	2.37	22.48	1.53	-2.14	79	.04	.54
Portrait	44.46	3.45	46.07	2.67	-2.13	79	.04	.52

Significant at the $p < .05$ level

Research Question 3: Is there a statistically significant difference between the rubric criteria mean scores by semester format?

Students in the experiential format scored significantly higher than students in the traditional format on specific rubric criteria in three of the seven assignments, Light, Depth of Field, and Black and White (Table 2). Specifically, significant differences were found on students' scores on composition and clarity (focus and exposure) within the rubric criteria.

Within Light-Composition, students in the experiential format ($M = 4.59$, $SD = .57$) scored significantly higher than students in the traditional format in composition ($M = 4.22$, $SD = .66$), $t(79) = -2.48$, $p = .02$. The effect size for this analysis ($d = .60$) showed a medium effect. Within Light-Clarity, students in the experiential format ($M = 4.44$, $SD = .58$) scored significantly higher than students in the traditional format ($M = 4.15$, $SD = .63$). The effect size for this analysis ($d = .50$) showed a medium effect. On Depth of Field-Composition, students in the experiential format ($M = 4.48$, $SD = .70$) scored significantly higher than students in the traditional format ($M = 4.07$, $SD = .72$). The effect size for this analysis ($d = .58$) showed a medium effect. On Depth of Field-Clarity, students in the experiential format ($M = 4.41$, $SD = .75$) scored significantly higher than students in the traditional format ($M = 3.78$, $SD = .88$). The effect size for this analysis ($d = .77$) showed a medium effect. And, in Black and White-Clarity, students in the experiential format ($M = 4.56$, $SD = .64$) scored significantly higher than students in the traditional format ($M = 4.22$, $SD = .72$). The effect size for this analysis ($d = .50$) showed a medium effect. These significant rubric criteria indicate experiential learning activities do have an effect on students' understanding of specific photography skills, especially composition and clarity. Further, the significant differences

in rubric criteria were found in the first three assignments given in the course, indicating experiential activities help students learn these skills more quickly.

Table 2.

Significant Comparisons of Students' Rubric Criteria Scores by Instruction Method

Variable	Traditional (n = 54)		Experiential (n = 27)		t	df	p	Cohen's d
	M	SD	M	SD				
Light								
Composition	4.22	.66	4.59	.57	-2.48	79	.02	.60
Clarity	4.15	.63	4.44	.58	-2.06	79	.04	.50
Depth of Field								
Composition	4.07	.72	4.48	.70	-2.12	79	.02	.58
Clarity	3.78	.88	4.41	.75	-3.18	79	<.01	.77
Black and White								
Clarity	4.22	.72	4.56	.64	-2.04	79	.05	.50

Significant at the p < .05 level

Conclusions

The results of this study suggest instruction method does have an effect on student performance in agricultural communications digital photography courses. Specifically, the results suggest when participating in a course utilizing an experiential intersession format, students' mean assignment scores increase. While individual assignment performance was less affected by instructional format, the results show students' understanding of specific photography skills (rubric criteria) was higher when in the experiential intersession format, especially students' understanding of composition and clarity is higher.

These findings support the recommendation that an experiential approach to photography instruction is beneficial to students' understanding of basic photography skills (Horner, 2016; Rand et al., 2015; Rand & Zakia, 2006). These findings support the recommended photography skill competencies for undergraduate students (Terry et al., 1995; Bogre, 2014). The in-the-field nature of the experiential instructional format provided regular feedback and coaching on composition, correct exposure, and focus, which aided in students' understanding of those skill areas. As a result, students in the experiential intersession format were more likely to submit images with proper exposure, focus, and composition. Additional observations noted when students were on field trips during the experiential intersession, they were more engaged with their subjects, especially when the subjects were animals, more motivated to complete assignments and improve their image quality, and more likely to use each other as resources for camera troubleshooting. These findings support Horner's (2016) use of varied location-based learning within Kolb's (1984) concrete experience stage of experiential learning.

Limitations

Before offering recommendations and implications of the study, limitations of the study should be recognized. First, the study's researcher was also the instructor of the photography course, which presented researcher bias during the data collection process. To lessen the effects of this bias, the same rubric was used to grade all assignments in both course formats. Additionally, students in the agricultural communications program at Texas Tech University have a choice when enrolling in a semester format of the digital photography course. The outdoor, travel-focused nature of the experiential intersession semester may attract a certain type of student, which results in self-selection bias in this study. Further, smaller sample sizes were present in the experiential intersession semester as the field trip style of the course caps the number of students who can enroll in the course. Caution should be taken when interpreting the study's findings beyond the scope of this study.

Recommendations

In response to the sample size limitations of the intersession semester, experiential learning activities were implemented in the traditional semester format of the agricultural communication photography course in spring 2017 to improve student performance and enhance their understanding of photography principles. As a result, three levels of experiential activities within the course emerged: low experiential, medium experiential, and high experiential. The low experiential level represents the 2016 traditional spring format, the medium experiential level represents the 2017 traditional spring format that incorporated experiential activities, and the high experiential level represents the intersession format in 2016 and 2017. These instruction strategies will be evaluated using quantitative ANOVA methods to compare the three formats to continue the examination of their effect on student performance. Additionally, qualitative data was collected from this study's population and is being analyzed using mixed-methods to further examine students' perceptions of instruction method and their perceived skill improvement in the different instruction methods. This additional data will provide more clarity into the comparison of an instructional format in an undergraduate digital photography course.

Several scholars in the photography instruction literature discuss the importance of critique as an experiential learning technique for students to get feedback on their work and apply that new information in subsequent assignments (Perkis, 2005; Rand & Zakia, 2006; Rand et al., 2015; Horner, 2016). Varying levels of critique were used in both the traditional and experiential formats of the course, but the effect of critique was not included in this study. Horner and Zakia (2006) suggest critique provides "the largest potential for learning in photographic/imaging education" (p. 123). Further, presenting the critique experience as part of the learning process can encourage students to approach positive and negative criticism with an expanded understanding of how the process can enable them to produce better images. Horner (2016) recommends the critiquing of images taken both by students in the photography class and other photographers as a way to engage students in the reflective observation stage of Kolb's experiential learning cycle. Reflective observation "takes place when students study their own images and reflect on the degree to which they demonstrated the technical and intellectual outcomes they intended to achieve" (p. 83). Critique helps students progress to the next stage of photography skill development (Perkis, 2005). The reflective process allows students to develop abstract concepts about what they have learned

(Kolb & Kolb, 2005). Future analysis of the effect of critique as an experiential teaching strategy is needed in agricultural communications photography courses.

Further examination of photography instruction effectiveness should be done to address the last two stages of Kolb's (1984) experiential learning theory, abstract conceptualization and active experiment. Abstract conceptualization requires learners to generalize the learned principles and develop new ways to apply them (Kolb, 1984). Within a photography course, Horner (2016) says the facilitation of discussion groups allows students to critically analyze, categorize, and comment on photographic works. During an active experiment, Kolb (1984) says learners actively influence others. At this stage in the photography learning cycle, Horner (2016) says students take ownership of their identity as a photographer.

The order in which assignments are due in the course may also play a role in the significant mean score differences found in this study. The order of assignments was not examined in this study, but further exploration of the timing of content and assignments in the photography course is needed.

Implications

The findings of this study, combined with previous research on experiential learning and photography instruction, provide implications for higher education photography courses in both agricultural communications programs and other disciplines that teach photography as part of their curriculum. Experiential learning activities in the form of field trips, campus walks, and outside-the-classroom demonstrations should be used to improve student performance and enhance their understanding of photography principles in agricultural communication photography courses.

While in-class instruction addresses the technical information needed for understanding specific photography concepts, the hands-on, field instruction allowed students to put those concepts into practice. Field trips away from campus proved to be beneficial in this study, but even simply stepping outside of the classroom and walking around campus gives students the opportunity to experiment with their cameras while getting immediate feedback from the instructor. For programs with limited resources and/or personnel to implement an experiential course format similar to the one examined in this study, the use of experiential strategies such as in-class critique and campus excursions during class time may be beneficial to students' understanding of photography skills and concepts.

There were consistent subject differences in the images submitted when comparing traditional versus experiential formats. For example, during the traditional format of the course when students had to shoot images on their own time, it was common for students to submit images captured around campus or the city of Lubbock. This required less effort on part of the student to explore new subjects. Images were more likely to include campus architecture, pets, city structures, or portraits of their friends rather than agriculturally-focused subjects. Images from students in the experiential intersession format were more agriculturally-focused as a result of the field trips to farms and ranches. For example, image submissions during the summer intersession captured agricultural practices (crop planting, cattle branding, and feedlots) because the instructor placed students in those environments.

In terms of generalization to other courses within agricultural communications, the results of this study could also be used in a video production class that utilizes many of the same principles of photography: composition, clarity, and creativity. The literature provides examples of experiential learning being implemented within capstone and service learning courses within

agricultural communications (Rushing, Miller, Edgar, & Cox, 2014) and in colleges of agriculture (Andreasen, 2004) with benefits to students' performance and understanding of concepts. Further examination of experiential learning in agricultural communications courses that include real-world activities in the curriculum is needed.

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