

6-10-2021

Assessing the Value of Video Resources in Extension-led Natural Resources Management Continuing Education Programs

Eli S. Sagor

University of Minnesota, esagor@umn.edu

Marcella A. Windmuller-Campione

University of Minnesota, mwind@umn.edu

Madison G. Rodman

University of Minnesota Duluth, mrodman@umn.edu



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Recommended Citation

Sagor, E. S., Windmuller-Campione, M. A., & Rodman, M. G. (2021). Assessing the Value of Video Resources in Extension-led Natural Resources Management Continuing Education Programs. *Journal of Extension*, 59(2), Article 8. <https://doi.org/10.34068/joe.59.02.08>

This Feature Article is brought to you for free and open access by the Conferences at TigerPrints. It has been accepted for inclusion in *Journal of Extension* by an authorized editor of TigerPrints. For more information, please contact kokeefe@clermson.edu.

Assessing the Value of Video Resources in Extension-led Natural Resources Management Continuing Education Programs

Cover Page Footnote

We are grateful to participants in the National Advanced Silviculture Program for their contributions to this study. This work is supported by the United States Department of Agriculture Forest Service, the University of Minnesota Extension, and the Minnesota Agriculture Experimentation Station (Project MIN-42-100).

Assessing the Value of Video Resources in Extension-Led Natural Resources Management Continuing Education Programs

ELI S. SAGOR¹, MARCELLA A. WINDMULLER-CAMPIONE¹, AND MADISON G. RODMAN²

AUTHORS: ¹University of Minnesota. ²University of Minnesota Duluth.

Abstract. Effective delivery of continuing education programs can improve their impact. Using the first of four two-week modules of a professional short course, we tested outcomes of a flipped classroom approach, comparing professional foresters' completion rates, preference for, and perceived value of pre-module content delivered via video and reading. Participants in the National Advanced Silviculture Program self-reported significantly higher pre-module completion rates, preference for, and perceived value of video over reading. This simple study suggests the potential for video to serve as an accessible and preferred format for delivery of key content to supplement an in-person continuing education program.

INTRODUCTION

Continuing education (CE) is crucial to the professional advancement of natural resource managers. After four to seven years pursuing undergraduate and graduate degrees, recent graduates from forestry and natural resources programs accredited by the Society of American Foresters (SAF) have a strong knowledge base and general understanding of forest ecosystem research (Kelly & Brown, 2019; Sample et al., 1999; Sample et al., 2015). However, for the next 25-40 years of their careers, they rely primarily, if not exclusively, on CE programs for structured learning about emerging research and evolution in the practice of resource management (Coffin et al., 2001; Innes, 2005). Innovation in the delivery of CE programs can increase the programs' effectiveness and impact, linking research and innovation in the practice of silviculture on the ground.

Annual professional development and CE credits are required to maintain professional certifications and credentials such as SAF Certified Forester (Block et al., 2000; Redelsheimer et al., 2015) and USDA Forest Service Certified Silviculturist. Continuing education is widely valued and needed by natural resource managers to refresh base skills, learn new skills and technologies, and gain new research-based information (Innes, 2005). As an example, those graduating before 2000 would have learned nothing about emerald ash borer (*Agrilus planipennis*), an invasive insect that is decimating the North American ash resource (D'Amato et al., 2018; Kovacs et al., 2010). Compared with those taught today's curricula, they would have learned little about climate adaptation, invasive species ecology, and modern remote

sensing techniques. Beyond GIS, none of these topics is even mentioned in a 1999 analysis of how undergraduate forestry curricula are evolving to meet changing demands (Sample et al., 1999).

To meet these needs, Extension and others offer online and in-person CE programs including webinars, conferences, short courses, workshops, trainings, and informational websites. In the US, land-grant university-based Extension forestry programs (Coffin et al., 2001) tend to be the primary CE providers for professionals as well as landowners (Sagor et al., 2014). Extension programs have begun to offer professional development and CE programs in a wider variety of modalities than traditional in-person workshops, leveraging emerging technology to improve educational outcomes and learner preferences (Sagor et al., 2014; Standiford, 2015) consistent with adult and professional learning theory (Knowles et al., 2011).

One innovative model, the "flipped classroom," has emerged to supplement and improve the quality of in-person Extension programming (Burns & Schroeder, 2014). In this context, the flipped classroom approach refers to providing some content for learners to review prior to the in-person session (Wilbeck & Kennedy, 2018). This can reduce in-person time dedicated to lecturing and replace it with more impactful, individualized discussion and interpretation activities (Larkin et al., 2018; Burns & Schroeder, 2014). While professional natural resource managers prefer in-person exchange to obtain research-based information, limited time for CE can reduce opportunities for in-person learning (Jacobi et al., 2011), lending appeal to models like

the flipped classroom that add flexibility and increase the impact of in-person time.

For this study, we consider content assigned for review prior to attending an in-person CE session as one version of the flipped classroom model. Effectiveness of the model is reduced when pre-session work is not completed by learners. One obvious strategy to boost pre-session content completion is to make the content more engaging. Exploring non-traditional content modalities offers one such opportunity.

Although the efficacy and appeal of online vs. in-person Extension instruction in general has been widely studied (DePhelps et al., 2019; Kudryavtsev et al., 2010), few studies have investigated specific outcomes of video vs. reading material as a component of the flipped classroom model. A few factors led us to question whether video might be a valuable substitute for some academic writing as instructional materials supporting a short course for professional natural resource managers. Video content may be more accessible and appealing to professional adult learners in a CE setting than academic writing (Vo et al., 2019) and has been widely adopted in many disciplines, including nursing (Maag, 2004), community development (Arbogast et al., 2017), youth development (Denniston, 2004), and many others. Video also offers added convenience because it is more easily accessed on small screens and can be consumed via audio only, unlike written materials.

To investigate the relative value of video and reading to support learning in an Extension short course, we tested instructional materials in the form of narrated slideshow videos and recorded presentations as an alternative to academic writing through the National Advanced Silviculture Program (NASP). NASP includes five modules, totaling approximately 13 weeks of instruction and a substantial independent project supporting the Certified Silviculturist credential on the USDA Forest Service's National Forest System (Gwaze et al., 2020). A key desired outcome is a stronger understanding of silviculture research and practice to inform future public land management. The first two-week module, hosted by University of Minnesota faculty at the Cloquet Forestry Center, includes two weeks of lectures, small-group exercises, field tours, critical reading, analysis, and presentation activities related to forested ecosystems in the United States.

From here on, we refer to content that learners are required to review before the module begins as pre-module content. Until recently, NASP pre-module content was delivered exclusively in the form of written material: excerpts from scholarly books, peer-reviewed literature, or research reports. Although NASP participants are generally highly motivated, it was clear to instructors that a substantial percentage were not completing all assigned readings for the course, hampering their readiness to learn. Beginning in 2017, we substituted video developed with this audience in

mind, in the form of short, narrated slideshows, for some of the reading material previously used in the course.

This study offers an important original contribution by evaluating the outcomes of a change in the modality of instructional materials from academic writing to video. Our research question was as follows: Does the modality of pre-module content affect completion, preference, and perceived value of that content for an audience of professionals engaged in a two-week short course?

METHODS

NATIONAL ADVANCED SILVICULTURE PROGRAM

First offered in 2007, the National Advanced Silviculture Program is the equivalent of a graduate-level course required for USDA Forest Service personnel to become Certified Silviculturists. Most NASP participants are federally employed professional foresters within the USDA's National Forest System, Bureau of Land Management, Bureau of Indian Affairs, or Natural Resources Conservation Service and range in professional experience from a few years to mid-career. The full NASP curriculum includes four modules, one of which is the Ecological Systems (hereafter "ES") module, which is delivered annually as a two-week-long in-person short course. The NASP ES module is the subject of this study.

MODULE 1: ECOLOGICAL SYSTEMS PRE-MODULE CONTENT

The NASP ES module is offered in July and August. Participants receive a welcome email in the spring with links to materials they are expected to review prior to the module. These materials include both video and written material. Videos range from two to 30 minutes in duration and are generally in the form of narrated slideshows, either produced for NASP participants or curated from available sources. The reading material includes carefully curated excerpts from peer-reviewed manuscripts or book chapters related to the primary content.

Both the videos and readings serve as either a refresher or introduction to key material that will be covered in the ES module. Together, they provide a solid foundation for entering the class, aligned well with the learning objectives of the ES module.

QUESTIONNAIRE

To assess perceptions of the value of pre-module content in different modalities, we used Qualtrics survey software (Qualtrics, Provo, UT) to administer an online questionnaire to members of the 2017, 2018, and 2019 NASP ES cohorts. These cohorts included 40, 35, and 35 participants, respectively. The questionnaire was administered in early August 2018 and 2019. Participants in 2017 thus received the questionnaire about a year after completing the module, while 2018 and 2019 participants received it shortly after

Video Resources in Extension-Led Natural Resources Management Continuing Education

completing module activities. The questionnaire included a statement that all responses would be confidential and would not affect performance assessments.

The questionnaire, which assured confidentiality of responses, included information about completion, preference, and perceived value of pre-module content by format.

Because personal behavior is generally not observable in the real world, self-reported data are commonly used to assess outcomes of Extension programs across disciplines, from nutrition education (Bonnett et al., 2019) to horticulture (Wilkins et al., 2019) to personal finance (Nielsen, 2011). In this case, with the primary variables of interest being comparisons between engagement with content in different formats, self-reported data are appropriate.

ANALYSIS

Content completion was assessed using separate measures before and during the ES module. Ratings of content preference and perceived value each included several sub-items. In each case, response items were reported on a four-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). We used paired-samples *t* tests to compare mean values for each item. We used Chi-square tests twice: to assess differences in frequency of referring to content before and during NASP by the same individuals, and to assess differences among respondents of different educational levels prior to NASP.

RESULTS AND DISCUSSION

Thirty-two of the 40 NASP participants in 2017, all 35 in 2018, and 26 of 35 participants in 2019 provided usable responses to the questionnaire for usable response rates of 80%, 100%, and 74.2% respectively, and an overall usable response rate

of 84.5%. There were no significant differences in years of experience or educational attainment prior to enrollment between cohorts (Table 1). Unless otherwise noted below, results from the three cohorts were pooled for analysis.

We were interested in whether NASP participants would report higher completion rates for assigned videos than readings. Before the module, content completion rates were substantially higher for videos than for readings (Table 2), with 87% of participants completing all videos compared with only 24.7% completing all readings.

This is consistent with prior work suggesting that factors like “increased workload” and “lack of time” are barriers to working professionals participating in Extension programs (Lakai et al., 2012; Mincemoyer & Kelsey, 1999). This is an important finding because it suggests that even with imperfect retention of all content, participants are more likely to have been exposed to content in the videos than in readings. The primary purpose of the pre-module content is to introduce concepts that will later be reviewed and discussed in person. Thus, participants may be better prepared for in-class activities for which pre-module content is presented in video rather than written form.

By contrast, during NASP, readings seemed to be the more popular resource, with about 89.9% of respondents having reviewed some or all readings during the module compared with only 69.3% having reviewed videos.

NASP participants rated videos significantly more highly on all seven metrics of preference and perceived value (Table 3). Preference ratings included assessments of how informative the content was as well as engagement, interest, and enjoyment. Value ratings included two assessments each of content relevance and level of detail. Based on these results, we reject the null hypotheses that there is no difference in NASP participants’ preference or perceived value, respectively, of video over reading content.

Table 1. Years of Experience and Educational Attainment for Respondents from Three NASP Cohorts

Variable	Cohort		
	2017	2018	2019
<i>n</i> (% of cohort)	32 (80%)	35 (100%)	26 (74%)
Years of experience			
0-5	5	12	8
6-10	11	8	9
11-25	14	13	7
>25	1	0	1
Highest level of education completed			
Bachelor’s degree	19	18	12
Some graduate coursework	1	2	2
Master’s degree	11	13	11

Table 2. Completion of Assigned Video and Readings before the NASP ES Module and Reference to Content in Each Format during the Two-Week Module

Time period	Content format	
	Video <i>n</i> (%)	Reading <i>n</i> (%)
Before ES Module: Some	12 (13.1%)	67 (75.3%)
Before ES Module: All	80 (86.9%)	22 (24.7%)
During ES Module: None	28 (30.8%)	9 (10.1%)
During ES Module: Some	38 (41.8%)	63 (70.8%)
During ES Module: All	25 (27.5%)	17 (19.1%)

Do differences in educational attainment prior to the short course affect content preference? Recognizing the extent to which processing reading material is required to complete a graduate degree, we hypothesized that NASP participants with a master's degree would report higher completion of and preference for readings than those who had not. However, our data suggest mixed results on this question. On one hand, those with a master's degree rated every preference and value statement about readings higher than those without (Table 4). This pattern suggests that respondents with a master's degree enjoy and value reading material more than those without. On the other hand, only two of these differences were statistically significant at $\alpha=0.05$: those with a master's expressed significantly stronger agreement with the statements "I found the readings informative" and "[t]he reading material was covered at the right level" than those without a master's. Mean differences were not statistically

significant for the other measures. Taken together, these results suggest a preference for readings among NASP participants with a master's degree over those without, but further study would be required to confirm this finding.

In this study, we made no attempt to relate completion of pre-module content in either modality to performance as indicated by final grades. Too many confounding variables could influence that relationship, including level of motivation and level of educational attainment (and thus perhaps prior exposure to both academic content in general and the topics covered in particular).

Participants seem to be using different content modalities prior to the start of class compared with during the class. We note higher usage of reading than video content during the module despite higher completion of video content before the module. Both modalities allow the reader to skip ahead, repeat content, pause to take notes, and so on, which different participants may do differently based on learning styles, but which are important to engagement and retention (Merkt et al., 2011). One possible factor is the relative ease of scanning, annotating, and reviewing personal notes on readings during the limited time available on-site. Another possibility is that videos provide a more engaging introduction to content, but that readings can provide additional depth which may be of interest during the class. This interesting difference would be worth investigating in future research.

Despite the generally higher ratings of video over reading material for this professional natural resource manager audience, several barriers to the widespread use of pre-module content remain, regardless of the modality. While video may convey complex content in a shorter time

Table 3. Mean Values for Preference and Relevance Ratings of NASP ES Video and Reading Content on a Four-point Likert Scale¹

Measure	<i>n</i>	Videos	Readings	Difference (video - reading)
Measures of content preference				
I found the [content] informative	89	3.35	3.03	0.32***
The [content] kept me engaged and interested	88	3.13	2.75	0.38***
I enjoyed the [content]	89	3.07	2.80	0.27***
Measures of content value				
The [content] was covered at the right level	88	3.33	3.01	0.32***
The [content] was neither too long nor too short	88	3.23	2.76	0.47***
The [content] provided a solid foundation for the start of the module	88	3.43	3.07	0.36***
The topics covered in the [content] were relevant to my learning in NASP	87	3.44	3.10	0.33***

¹Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Significance ratings are based on paired-samples *t* tests where *** = $p \leq 0.001$. Columns 2 and 3 include mean and standard deviation.

Video Resources in Extension-Led Natural Resources Management Continuing Education

Table 4. Ratings of Reading Content for Respondents with and without a Master's Degree on a Four-point Likert Scale¹

Measure	Master's (n=35)	No Master's (n=54)	Difference (MS–no MS)
Measures of content preference			
I found the readings informative	3.14 (0.355)	2.96 (0.355)	0.18*
The readings kept me engaged and interested	2.83 (0.514)	2.69 (0.507)	0.14
I enjoyed the readings	2.89 (0.471)	2.74 (0.483)	0.15
Measures of content value			
The reading material was covered at the right level	3.11 (0.404)	2.94 (0.302)	0.17*
The readings were neither too long nor too short	2.89 (0.530)	2.69 (0.543)	0.20
The readings provided a solid foundation for the start of the module	3.18 (0.459)	3.00 (0.392)	0.18
The topics covered in the readings were relevant to my learning in NASP	3.20 (0.406)	3.04 (0.437)	0.16

¹ Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Significance ratings are based on paired-samples *t* tests where * = $p \leq 0.05$.

than written material, adult learners may still struggle to find the time to review it given the lack of recognition of these efforts in the form of CE credits. While barriers remain to the widespread use of flipped classroom approach in CE programs, our results suggest further investigation to ensure that CE programming is as effective as possible to meet the complex needs of natural resource managers.

Since readings were obtained from existing published material and some of the videos were custom produced, one might expect a higher perceived relevance to the video content independent of its format. We view this effect, if it exists at all, as minor. Recognizing the time constraints facing NASP participants as they prepare for the short course, we take several steps to communicate the relevance and value of both readings and video content. These include 1) careful selection of readings, including excerpts, to ensure relevance and applied value; 2) frequent use of markup indicating which sections are relevant and which are not; 3) communicating how carefully we have selected content and that we view readings and videos as highly relevant to the course. Knowing the content, we are confident that most differences in student ratings reflect the format rather than the relevance.

CONCLUSIONS

The results presented here support the idea that for an audience of professional natural resource managers engaged in a short course, video content can be easier to complete, more appealing, and more valuable to learners than readings. These findings are consistent with the adult education literature (Bordes et al., 2021; Maag, 2004; Schober et al., 2016; Shiu et al., 2020) including research pertaining to designing

for multiple learning styles (Driessen, 2013; Knowles et al., 2011) and suggest that there is value in video recordings as a substitution for off-the-shelf reading material.

Our results strengthen the case that video can add important value to Extension CE programs, increasing learning outcomes and ultimately, impacts. As in other professional development settings such as medical training (Bordes et al., 2021; Vo et al., 2019), video appears to meet the needs of this group of professional natural resource managers. Mixing the preferred video format in with well-curated academic text may better accommodate diverse learning styles and prepare participants for the short course better than either format would on its own.

Professionals who had completed a master's degree prior to NASP appeared to slightly favor readings over video, although these results were not conclusive. Further investigation of this difference would be warranted in order to offer content as well designed as possible for the intended audience.

Our interpretation of these results, which we believe are relevant to many Extension programs, is that presenting content in multiple formats is beneficial to learners. Our results suggest that video is, in some ways, a more appealing format than academic writing for a professional audience seeking CE. Including video as well as carefully curated academic writing may also better accommodate the learning styles and preferences of diverse learners. Further, as video production tools have become more widely available to Extension program faculty and staff (Thompson et al., 2018; Dev et al., 2018), our results suggest that integrating video to support in-person programming may be beneficial.

REFERENCES

- Arbogast, D., Eades, D., Plein, and L. C., 2017. Repurposing video documentaries as features of a flipped-classroom approach to community-centered development. *Journal of Extension*, 55(5), Article V55-5IW4. Available at: <https://archives.joe.org/joe/2017october/iw4.php>
- Block, N. E. (2000). Credentialing and accreditation programs: Taking the forestry profession to the next level. *Journal of Forestry*, 98(4): 18–22.
- Bonnett, R., Camire, M. E., Therrien, M., and Yerxa, K. 2019. Long-term behavior change of participants in a northeast nutrition education program. *Journal of Extension*, 57(2), Article V57-2RB4. Available at: <https://archives.joe.org/joe/2019april/rb4.php>
- Bordes, S. J., Walker, D., Modica, L. J., Buckland, J, and Sobering, A. K. 2021. Towards the optimal use of video recordings to support the flipped classroom in medical school basic sciences education, *Medical Education Online*, 26:1. <http://doi.org/10.1080/10872981.2020.1841406>
- Burns, C. S. and Schroeder, M. M. (2014). Are you ready to flip? A new approach to staff development. *Journal of Extension*, 52(5), Article 5IAW4. Available at: <https://archives.joe.org/joe/2014october/iw4.php>
- Coffin, B. A., Yount, L., and Daley Laursen, S. 2001. Sustainable Forests Education Cooperative: An Experiment in Collaborative Continuing Education. *Journal of Forestry*, 99(9): 26–30.
- D'Amato, A., Palik, B., Slesak, R., Edge, G., Matula, C., & Bronson, D. (2018). Evaluating adaptive management options for black ash forests in the face of emerald ash borer invasion. *Forests*, 9(6), 348.
- Denniston, D. 2004. The use of new and innovative DVD technology to teach competitive youth horse judging teams. *Journal of Extension*, 42(3), Article 3TOT3. Available at: <https://archives.joe.org/joe/2004june/tt3.php>
- DePhelps, C., Newman, S., Golden, L., and Mayes, I. 2019. Using hybrid learning to improve educational programs for small-acreage farmers. *Journal of Extension*, 57(4), Article V57-4RB2. Available at: <https://archives.joe.org/joe/2019august/rb2.php>
- Dev., D. A., Blich, K. A., Hatton-Bowers, H., Ramsay, S., and Garcia, A. S. 2018. How to create videos for extension education: An innovative five-step procedure. *Journal of Extension*, 56(2), Article V56-2IW3. Available at: <https://archives.joe.org/joe/2018april/iw3.php>
- Driessen, S. 2013. Food preservation mini-modules offer options for learners and extension staff. *Journal of Extension*, 51(6), Article V51-6IW7. Available at: <https://archives.joe.org/joe/2013december/iw7.php>
- Gwaze, D., Windmuller-Campione, M., Keyser, T., and Sweeney, C. 2020. National Advanced Silviculture Program: A panel discussion. In: Pile, Lauren S.; Deal, Robert L.; Dey, Daniel C.; Gwaze, David; Kabrick, John M.; Palik, Brian J.; Schuler, Thomas M., comps. The 2019 National Silviculture Workshop: a focus on forest management-research partnerships. Gen. Tech. Rep. NRS-P-193. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station: 124–128.
- Innes, J.L. (2005). Challenges facing forest educators in North America. *Forest Science and Technology*, 1(2): 127–134. <http://doi.org/10.1080/21580103.2005.9656279>
- Lakai, D., Jayaratne, K. S. U., Moore, G. E., and Kistler, M. J. 2012. Barriers and effective educational strategies to develop extension agents' professional competencies. *Journal of Extension*. 50(4), Article 4RB1. Available at: <https://archives.joe.org/joe/2012august/rb1.php>
- Larkin, D. J., Weber, M. M., Galatowitsch, S. M., Gupta, A. S., and Rager, A. 2018. Flipping the classroom to train citizen scientists in invasive species detection and response. *Journal of Extension*, 56(5), Article V56-5TT1. Available at: <https://archives.joe.org/joe/2018september/tt1.php>
- Jacobi, W. R., Crump, A., Lundquist, J.E. (2011). Dissemination of forest health research information in the Rocky Mountains. *Journal of Forestry*, 109(1): 43–49.
- Kelly, E. C. and Brown, G. (2019). Who are we educating and what should they know? An assessment of forestry education in California. *Journal of Forestry*, 117(2): 95–103.
- Knowles, M. S., Holton, E. F. III, and Sawnsen, R. A. (2011). *The Adult Learner* (7th ed.). Butterworth-Heinemann.
- Kovacs, K. F., Haight, R. G., McCullough, D. G., Mercader, R. J., Siegert, N. W., & Liebhold, A. M. (2010). Cost of potential emerald ash borer damage in U.S. communities, 2009–2019. *Ecological Economics*, 69(3): 569–578.
- Kudryavtsev, A., Krasny, M. E., and Walther, J. B. 2010. Dissemination of outreach education programs: In-person and computer-mediated strategies. *Journal of Extension*, 48(5), Article V48-5A4. Available at: <https://archives.joe.org/joe/2010october/a4.php>
- Lakai, D., Jayaratne, K. S. U., Moore, G. E., and Kistler, M. J. 2012. Barriers and effective educational strategies to develop extension agents' professional competencies. *Journal of Extension*, 50(4), Article 4RB1. Available at: <https://archives.joe.org/joe/2012august/rb1.php>
- Larkin, D. J., Weber, M. M., Galatowitsch, S. M., Gupta, A. S., and Rager, A. (2018). Flipping the classroom to train citizen scientists in invasive species detection and response. *Journal of Extension*, 56(5), Article 5TOT1. Available at: <https://archives.joe.org/joe/2018september/tt1.php>
- Maag, M. 2004. The effectiveness of an interactive multimedia learning tool on nursing

Video Resources in Extension-Led Natural Resources Management Continuing Education

- students' math knowledge and self-efficacy. *Computers, Informatics, Nursing*, 22(1):26–33.
- Merkt, M., Weigand, S., Heier, A., and Schwan, S. 2011. Learning with videos vs. learning with print: The role of interactive features. *Learning and Instruction*, 21(6): 687–704.
- Mincemoyer, C., & Kelsey, T. (1999). Assessing in-service education: Identifying barriers to success. *Journal of Extension*, 37(2), Article 2FEA3. Available at: <https://archives.joe.org/joe/1999april/a3.php>
- Nielsen, R. B. 2011. A retrospective pretest-posttest evaluation of a one-time personal finance training. *Journal of Extension*, 49(1), Article V49-1A4. Available at: <https://archives.joe.org/joe/2011february/a4.php>
- Redelsheimer, C. L., Boldenow, R., Marshall, P. (2015). Adding value to the profession: The role of accreditation. *Journal of Forestry*, 113(6): 566–570.
- Sagor, E. S., Kueper, A. M., Blinn, C. R., Becker, D. R. (2014). Extension Forestry in the United States: A national review of state-level programs. *Journal of Forestry*, 112(1): 15–22.
- Sample, V. A., Ringgold, P. C., Block, N. E., and Giltmier, J. W. (1999). Forestry education: adapting to the changing demands. *Journal of Forestry*, 97(9):4–10.
- Sample, V. A., Bixler, P. R., McDonough, M. H., Bullard, S. H., Snieckus, M. M. (2015). The promise and performance of forestry education in the United States: Results of a survey of forestry employers, graduates, and educators. *Journal of Forestry*, 113(6): 528–537.
- Schober, D. J., Sella, A. C., Fernandez, C., Ferrel, C., & Yaroch, A. L. (2016). Participatory action research to develop nutrition education videos for child care providers: The Omaha nutrition education collaborative. *Pedagogy in Health Promotion*, 2(4), 244–250.
- Shiu, A., Chow, J., and Watson, J., 2020. The effectiveness of animated video and written text resources for learning microeconomics: A laboratory experiment. *Education and Information Technologies*, 25:1999–2022.
- Standiford, R. B. 2015. Distance education and new models for forestry education. *Journal of Forestry*, 113(6): 557–560.
- Thompson, L. J., Krienke, B., Ferguson, R. B., and Luck, J. D. 2018. Using 360-degree video for immersive learner engagement. *Journal of Extension*, 56(5), Article V56-5TT2. Available at: <https://joe.org/joe/2018september/tt2.php>
- Vo, T., Ledbetter, C., and Zuckerman, M. 2019. Video delivery of toxicology educational content versus textbook for asynchronous learning, using acetaminophen overdose as a topic. *Clinical Toxicology*, 57(10):842–846.
- Wilbeck, J. and Kennedy, M. B. (2018). Educational innovations for continuing education: JumpStart modules for advanced practice providers. *Advanced Emergency Nursing Journal*, 40(3):194–197.
- Wilkins, T., Gable, M., Alviz, K., Webb-Martinez, K., and Womack, M. 2019. Sowing seeds of evaluation: A pilot study measuring master gardener program public benefit. *Journal of Extension*, 57(6), Article V57-6RB3. Available at: <https://archives.joe.org/joe/2019december/rb3.php>