Development of the Digital Field Experience Model to Engage Adult Extension Audiences Synchronously Online

Introduction

Agricultural and natural resource (ANR) science communicators, educators, and Extension professionals can leverage instructional and communication technologies (ICTs) in programming to engage adult audiences (Benge et al., 2011; Davis, 2015; Israel & Henderson, 2018; Wintersteen, 2019). Mobile technologies and the internet have greatly influenced how people create and consume information and the design and implementation of learning environments (Anderson, 2008a; Schwab, 2007). Prior research indicated Land-grant universities should continue to adapt to the evolving Information Age, train Extension professionals to use ICTs, and leverage ICTs for innovative communication and education with diverse audiences to remain credible and relevant (Campbell, 1998; LaBelle, 2012). Communicators and educators can use instructional design and development practices and ICT tools to create engaging Extension programs to increase participants' ANR awareness and content knowledge (Campbell, 1998; Kurt, 2017; LaBelle, 2012; Seevers & Graham, 2012; Szpak, n.d.). While in-person communication and learning are ideal, they are not always possible, and Land-grant University faculty and scientists should be trained to leverage web-based ICTs to reach audiences beyond physical location logistics (APLU, 2009). Additionally, global disasters and pandemics such as COVID-19 will continue to exacerbate the need for Extension to utilize ICTs for message and content engagement.

Prior research has indicated there is a need to provide more professional development training in communication, instructional design, and ICT usage for Extension communication professionals and agents (Benge et al., 2011; Gibson & Hillison, 1994; Lakai et al., 2014; Muscato et al., 2020). Meanwhile, ICTs are an innovation that continue to diffuse and grow in popularity around the world (Schwab, 2007; Anderson, 2008a). An example of an ICT is electronic field trips (EFTs) for youth audiences (Cavanaugh, 2001; Tuthill & Klemm, 2002; Greene et al., 2014; Smaldone et al., 2011). EFTs often include a live two-way interactive broadcast connection between one location to another where youth can engage with a subject matter expert and location they otherwise would not have been able to visit (Adedokun et al., 2021; Cassady et al., 2008). EFTs are considered best practice for vicarious learning when in-person field trips are not possible due to logistical reasons such as financial constraints, scheduling, or distance from the event site. Streaming Science published two EFT models to engage youth audiences including suggested procedures for communication formats, ICTs, program examples, and outcomes (Beattie et al., 2020; Loizzo et al., 2019).

The following professional development article builds on the EFT concept; however, it introduces the digital field experience (DFE) model to engage adult audiences through live, digital programs. Prior to DFEs, Extension agents provided face-to-face lessons about topics such as soils and crops, plants, and animal nutrition through on-farm demonstrations using formats such as moveable schools (Rasmussen, 1989; Seevers & Graham, 2012). Through ICTs and the DFE model, Extension can continue to engage adult audiences in ANR, family and consumer sciences, and community development concepts at a larger scale across the country and beyond. The procedures outlined in the following sections include a DFE training program, DFE design and model for delivery, and the description and results of a pilot of the DFE model.

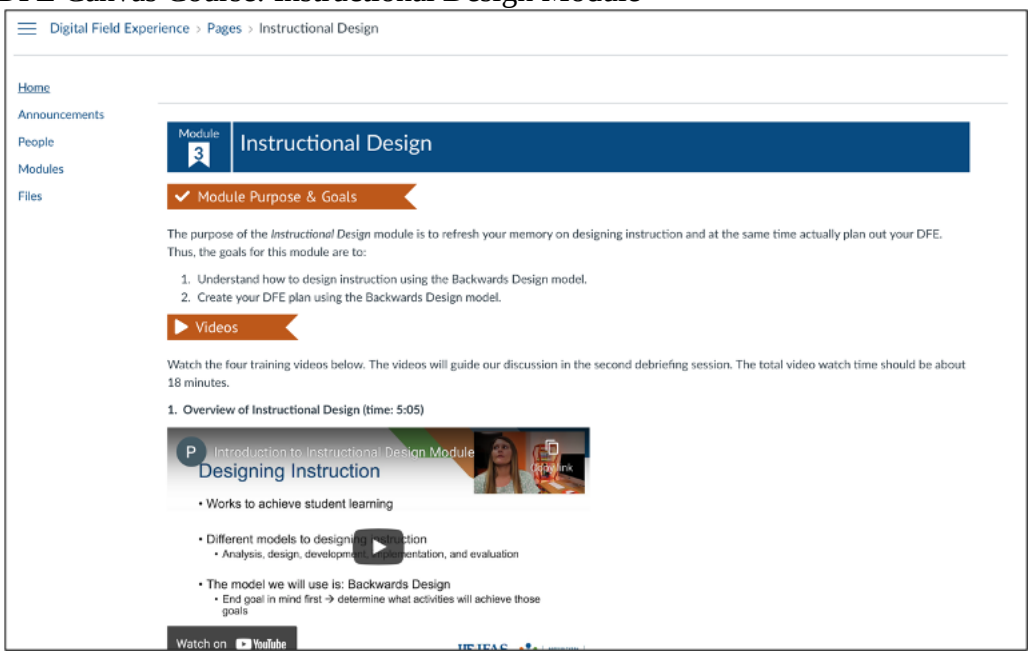
Procedures

In a pilot program, the lead author taught three UF/IFAS Extension agents about DFEs, adult learning, instructional design, and instructional and communication technologies. Throughout the training program the Extension agents developed and delivered their own DFE. In-depth steps and procedures to training individuals and designing and delivering a DFE are shared below.

DFE Training Program

The DFE training program consisted of four online modules delivered asynchronously. The modules included the following content: (a) an introduction to DFEs, (b) adult learning, (c) instructional design, and (d) ICTs. The content for the adult learning and instructional design modules were video recorded. The introduction and ICT modules included numerous already-developed resources provided by other agricultural communication, education, and Extension colleagues. The modules were shared through the IFAS Canvas Catalog. This version of Canvas is for public learners and does not require a university identification number or paying credit hour tuition rates (see Figure 1). Each module was approximately 1.5-2 hours in length and was open for two weeks in duration. A one to two-hour synchronous, debriefing session followed the adult learning and instructional design modules.

Figure 1
DFE Canvas Course: Instructional Design Module



Note. Screen capture courtesy of author.

Designing DFEs

The Extension agents were given only three firm parameters to guide the development of their DFEs. The intention was for the agents to construct the DFE to fit their individual Extension

programs, which resulted in different formats and the delivery across the DFEs. The three parameters included: (a) digital delivery of the experience; (b) a component which must include a synchronous, live field experience; and (c) designed for adults as the target audience.

DFE Plan

As a part of the instructional design module in the DFE training program, the Extension agents were asked to plan their DFE using a planning template. The Extension agents' completed DFE plans were used as an instrument to formatively evaluate their learning.

Pilot Case Study

The format and delivery of each agent's DFEs are shared in detail below. Table 1 provides a comparison chart of the DFEs.

Table 1
Comparative Description of the Extension Agents' DFE.

Extension Agent (Pseudonym)	Cameron	Taylor	Jordan
Digital Platform Used	Zoom meeting	Zoom webinar	Zoom meeting
Synchronous, live field experience	Cooking demonstration	Beehive tour	Insect collection
Adult audience	0 participants	25 participants	15 participants
Equipment	– iPhone – iPhone stand – iPad – Tripod (for iPad) – Laptop – Light kit	– Desktop computer (3; one for each agent) – iPad – lavalier microphone – MiFi	– Desktop computer – iPad
Location(s)	– demonstration kitchen	– Taylor's office – Beehives – Agents' respective offices	– Jordan's office – Extension office lab

The Extension agents hosted their DFEs approximately two weeks after the completion of the training modules and the last debriefing session. The lead author observed and collected data

using an observation rubric during the Extension agents' DFEs. Initial observations of the DFEs were conducted in real time. In addition, the Extension agents' DFE recordings and completed DFE plans were collected as data artifacts to be able to provide a deep understanding of the format and delivery of their DFEs; the platform that was used to digitally deliver the DFE; to determine how the DFE was formatted; and how the Extension agents incorporated the synchronous, live field experience. Other emergent observations were noted and used to provide a detailed description of the Extension agents' DFE. The observational outcomes of the DFEs are shared below here.

Outcomes

Cameron: Easy, simple, healthy cooking demonstration

Cameron was unable to host the DFE due to a lack of participant registration. Thus, the following description of their DFE reflects what was planned for the experience and the pilot version. Cameron intended for their DFE to focus on a cooking demonstration of two easy, simple, and healthy recipes. The DFE was going to be digitally hosted via a Zoom meeting.

Cameron intended to use a variety of equipment due to the demonstration nature of the DFE. Cameron had two colleagues to assist with the delivery of the DFE. They planned to use an iPhone and an accompanying stand that mounted to the table and extended above the cooking space to give participants a bird's-eye view of Cameron adding in or mixing ingredients. An iPad mounted to a tripod was going to act as the main camera, and a laptop was going to serve as a hub to see the participants and check the camera angles to always ensure that the participants were able to correctly see what Cameron intended for them to see. They were going to use a light kit to add artificial light to the room to enhance the viewing experience for the participants.

Cameron planned to capture the entire DFE in one location, the kitchen. The agenda for the DFE intended to start with welcoming the participants to the DFE. Then, to meet the objectives outlined in their DFE plan, a discussion about nutrition was scheduled. The discussion would have included the benefits and the nutrients provided by the ingredients, how recipes can be altered to add more nutritional value, suitable substitutions for ingredients, and cooking terms such as measuring and zesting. The objectives of the DFE were to "increase knowledge of nutrition benefits of Florida produce" and to "explain how to incorporate Florida produce into their meal plans." Cameron's DFE was prepared to provide a cooking demonstration for two recipes using Florida produce, Porcupine Sliders, and Fresh from Florida Strawberry Pop Pastries. The DFE was planned for one hour.

Taylor: Virtual beehive tour

Taylor chose to focus their DFE around bees and beekeeping and provided a virtual beehive tour. Taylor noted in their DFE plan that the DFE was designed to meet the overarching goals of "[increasing] awareness and appreciation of our food systems and our environment" and "[increasing] sustainability and conservation of resources in our Florida communities." They chose to digitally deliver the experience via Zoom webinar. The Zoom webinar format allowed participants to only see the presenters and the content shared by the presenters. Participants in a Zoom webinar are not allowed to see each other, and the functions the participants have access to are dependent upon the facilitators and presenters. Taylor chose to give the DFE participants

access to the question-and-answer feature and the raise hand feature but restricted participants' access to the chat feature. This decision was made to limit the number of features available to ask questions to reduce confusion for the participants and facilitators. Individuals participating in Taylor's DFE could ask questions directly via the question-and-answer feature or raise their hand and then be allowed to verbally ask questions. However, they were unable to chat amongst themselves.

Taylor hosted the DFE with two other Extension agent colleagues, and they used desktop computers, an iPad, a lavalier microphone, and a MiFi internet pack to host the DFE. Taylor and colleagues used their desktop computers inside the Extension office to host the beginning and the end of the DFE. The middle portion of the DFE included their synchronous, live field experience, including a virtual tour of the beehive outside behind their Extension office. They used one iPad to capture the live footage, one of the Extension agents had a lavalier microphone (i.e., the agent who conducted most of the tour), and the MiFi internet pack for the iPad was used to receive an internet connection since the beehives were out of range of the office WiFi.

Taylor used a PowerPoint presentation to showcase some beehive and beekeeping content before heading into the synchronous, live field experience portion of the DFE. Taylor used informative pictures and plain language to present the beginning material to discuss "the importance of pollinators to agriculture and the role of beekeepers." The beginning material took about 21 minutes. Then, Taylor moved outside to join two additional colleagues for the synchronous, live field experience portion of the DFE (see Figure 3). Taylor and colleagues gave a virtual tour of the beehives and used participants' questions coming in through the question-and-answer feature to guide parts of the tour. The virtual beehive tour was about 29 minutes. Then, the three Extension agents went back inside the Extension office to wrap up the DFE. The conclusion included a few more slides of information and an extended time for more questions from the audience. All three of the Extension agents took turns answering the participants' questions based on the content. The ending portion of the DFE was about 22 minutes, which was about 15 minutes over the one hour scheduled time for the DFE, due to the immense number of questions that came in from the participants. There were 25 participants who joined the virtual beehive tour DFE. Taylor recorded the DFE and uploaded the recording to YouTube as an archive.

Figure 3

Snapshot of Taylor's Beehive Virtual Tour

Note. Screen capture courtesy of author.

Jordan: The importance of beetles in the landscape

Jordan's goal for the DFE was to highlight "the importance of certain species of insects in the environment." Specifically, they focused on the "importance of recycling beetles in supporting environmental quality" in the landscape and "[identifying] common beneficial beetles in the landscape." Jordan delivered the DFE as a third part of a larger Extension program titled "Rotted, Recycled, and Resurrected."

Jordan and two other colleagues coordinated the implementation of the DFE. One colleague joined the DFE via Zoom, introduced the DFE and assisted in answering questions at the conclusion of the DFE. The other colleague filmed the DFE from the iPad when moving to the synchronous, live field experience portion of the DFE. Jordan and colleagues used a desktop computer and PowerPoint presentation for a portion of the DFE and they also used an iPad to capture the moveable parts of the DFE.

Jordan hosted the DFE in three segments and switched between their office and the lab located in the Extension office. Jordan used a PowerPoint presentation to introduce and discuss beetles from their office. The introduction and discussion on beetles via the PowerPoint presentation lasted about 31 minutes. Jordan then took the participants, via an iPad, to the lab for the synchronous, live field experience portion of the DFE. In the lab, Jordan proceeded to show the participants around a beetle collection to display the species found in Florida, previously covered in the PowerPoint presentation (see Figure 2). The field experience portion of the DFE was about 10 minutes in length, then participants were digitally taken back to Jordan's office where the DFE was ended. The conclusion of the DFE included a short verbal quiz where the participants were asked questions and shared their answers in the chat feature. The conclusion also included an opportunity for the participants to ask questions. The conclusion was about 16 minutes in length, totaling 57 minutes for the entire DFE. Fifteen participants joined the DFE. The DFE was recorded, then edited by a county government employee, and shared via the county government YouTube channel.

Figure 2

Snapshot of the Beetle DFE Live Field Experience

Note. Screen capture courtesy of author.

Discussion and Conclusion

The DFE was designed to digitally engage adult audiences with Extension content through a live, synchronous field experience. The Extension agents who participated demonstrated the flexibility of the DFE and that DFEs can be delivered using a variety of ICTs. Overall, the Extension agents seemed to be pleased with and excited about the experience. A digital experience with a live, hands-on (as they referred to it) component was something that they had been wanting to venture out and try, but they had not committed to doing yet.

The Extension agents adapted the content and the format of the DFE to fit their respective Extension programs, which included a cooking demonstration, the importance of beetles, and a virtual beehive tour. The Extension agents chose to *digitally deliver* their DFEs via Zoom meeting or Zoom webinar. Compared to other digital educational experiences, the Zoom platform was not used to host past EFTs (Adedokun et al., 2012; Beattie et al., 2020; Cassady et al., 2008; Loizzo et al., 2019) and was not commonly used to connect with Extension clientele for videoconferences.

The format the Extension agents in the current study chose for their *live, synchronous field experience* component of the DFE differed. For example, two of the agents chose to break their DFE into three sections where they used a PowerPoint presentation to introduce related content, then they moved to the *live, synchronous field experience* portion, and then back to the PowerPoint presentation for conclusions and wrapping up. One participant, Cameron, chose to have the *live, synchronous field experience* be the major focus of the DFE to integrate content throughout the field experience. In comparison, many of the EFTs hosted for youth audiences were formatted to include anywhere from three to seven different content segments throughout the experience (Adedokun et al., 2012; Loizzo et al., 2019).

The Extension agents in the current study hosted their DFEs for one hour to one hour and 15 minutes in length. Whereas many of the EFTs for youth audiences lasted anywhere from 45 minutes to three hours (Adedokun et al., 2012; Beattie et al., 2020; Loizzo et al., 2019). The equipment the Extension agents in the current study chose to use in the production of their DFEs varied in size and scope. Some agents mimicked the low-cost nature of the EFTs (Cavanaugh, 2001; Greene et al., 2014; Smaldone et al., 2011) and only used a desktop computer and an iPad. Other agents chose to use more technical equipment such as a portable WiFi hotspot to connect to the Internet from field locations or an artificial light kit. The format the Extension agents chose for their DFEs varied from each other and from many of the EFTs conducted for youth audiences. However, the Extension agents conducted their DFEs within the parameters that constituted a DFE, and they were able to adapt the DFE to meet the needs of their individual Extension programs.

The Extension agents in the current study described having a positive journey through adoption of the DFE and stated their intentions to continue implementing DFEs in their Extension programs. Although Cameron was personally committed to continuing adoption, lack of registration for the DFE did not allow for full implementation as there was no adult audience present. However, Cameron did practice her DFE in preparation for the DFE with an audience. The other two Extension agents were successful in the implementation of their DFEs with a digital audience present. The agents expressed an increased confidence in implementing DFEs, enjoyment of the ability to deliver Extension experiences in a new way, and intent to host DFEs

in the future. The Extension agents expressed feelings of reduced dissonance about how to digitally deliver hands-on experiences for their clientele. Implementing a digital experience with a “hands-on” component was something they had wanted to do but were not certain how to go about it. As such, the Extension agents indicated their commitment to using DFEs as a tool for delivering experience as a part of their Extension programs in the future.

Recommendations

The pilot program for DFEs and the DFE training produced positive and promising outcomes for the future of DFEs. However, there are a few recommendations for practice that could further develop DFEs and DFE training.

DFE Assistance

Each Extension agent included in the current study reported having two people, in addition to themselves, assist with the production of the DFE. For Extension agents new to implementing DFEs, it is recommended they have supplemental help with the DFE's production process. As the Extension agents continue to implement DFE, and their confidence in producing DFEs continues to increase, it is likely that they will require less help with the production process.

The synchronous, live nature of the DFE left considerable room for technical errors to occur. Testing the equipment and piloting the DFE with an audience is strongly recommended to mitigate any possible technical issues before the DFE starts. Becoming familiar with the technology and working out technical issues can give the Extension agents increased peace of mind and confidence in conducting the actual DFE with their audience.

The Extension agents expressed a lack of understanding about the DFE. The lack of understanding is partly due to the lack of literature about DFEs and the limited number of DFE-like experiences previously conducted. However, an increased level of understanding could result in greater awareness of and the positive impacts from adopting the DFE. Deeper understanding and awareness could more easily keep Extension agents engaged and continuing progression to adoption.

DFE Training

The Extension agents recommended expanding the ICT portion of the training program. They suggested it would have been helpful to be exposed to different ICT tools they could use to host their DFE. Furthermore, they suggested that Extension agents who are further behind on the ICT adoption curve might require more advanced ICT training than the innovators and early adopters would need. Thus, an increased focus on ICT tools that could be used to deliver DFEs should be added to the training program and the degree of thoroughness of this portion of the training should be altered based on the audience in attendance.

Participants described barriers that could potentially hinder their continued implementation of DFEs, such as a lack of basic technological equipment, institutional support of evaluation methods for more innovative program activities, and training to stay current with technological changes. As an Extension system, UF/IFAS Extension could work to implement changes to reduce the burden of these barriers on Extension agents. Reducing these barriers is

critical to the success of Extension adapting to 21st-century delivery methods as required by individuals today (Campbell, 1998; LaBelle, 2012; Seevers & Graham, 2012).

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