Case Study: Introductory Student Onboarding With a Place-Based, Blended Welcome Tour

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Abstract

Many introductory students face challenges adjusting to new geographic, social, and cultural contexts involved in their course of study, yet the extent of a student's integration and "sense of place" in an academic environment is associated with their performance and persistence toward related goals. This case study describes a place-based blended learning activity we created in ArcGIS StoryMaps (https://storymaps.arcgis.com/) to acclimatize students to the novel environment of an introductory animal sciences course during the first week of the semester. Using an embedded mixed-method design, this activity combines two complementary sources of data: 1) a qualitative personal account of activity design and implementation during the fall 2020 and fall 2021 semesters, and 2) an embedded quantitative survey of student learning outcomes and perceptions of the activity in the fall 2021 semester. Qualitative results illustrated instructional design choices related to the course context and instructional constraints and illuminated potential modifications to the activity's collaborative and assessment elements. Quantitative results on a 5-pt. anchored scale suggested that the activity was very effective at orienting students to the course's geographic context (M = 4.0, SD = 0.9), moderately effective at facilitating social bonding (M = 3.5, SD = 1.1), and moderately effective at increasing historical-cultural awareness related to the department (M = 3.2, SD = 1.3). Our results indicated that blended, place-based learning served as an effective onboarding activity in the context of our course.

Keywords: ArcGIS, StoryMap, place-based, blended learning, campus tour, introductory

Post-secondary introductory courses serve as the initial gateways to participation in scientific and agricultural disciplines, where students' experiences can either promote their sustained engagement or instead incline them to drop-out (Scott et al., 2017; Parsons et al., 2002; Koenig et al., 2012). Research has shown that student experiences during the first week of a college class can impact their motivation and performance longitudinally. For example, Wilson and Wilson (2007) reported an experiment on the first day of an introductory psychology course, in which students randomly assigned a positive-emotional-tone overview lecture outperformed students assigned a neutral-emotional-tone overview and content lecture throughout the semester. Although experimental work is currently limited, classroom observation and survey research suggest that many first-week experiences in undergraduate introductory science, technology, engineering, and mathematics (STEM) courses may underutilize the motivation- and performance-boosting potential of the first week course sessions. For example, in direct observations of the first-day topics covered by STEM instructors participating in a faculty development program, Lane et al. (2021) found wide variation in the percentage of class time allocated to STEM content and non-content topics. On average, these instructors dedicated very little of the first class period to building community and promoting diversity and inclusion, instead focusing primarily on course policies and basic information (Lane et al., 2021). With respect to the format, Friedrich and colleagues (1993) found that most first-day experiences were lecture-based and did not employ interactive or collaborative strategies in a survey of 145 STEM and non-STEM instructors. These studies of introductory topics and format are consistent with the content-focused, lower-cognitive-level learning goals embodied at the course level by the learning goals and assessment items of 77 introductory STEM courses analyzed by Momsen et al. (2010). In summary, these results indicate that introductory STEM courses often use content- and policies-focused first week teaching practices that offer less support for the retention and performance of their diverse student constituents relative to student-centered learning (Freeman et al., 2014; Theobald et al., 2020).

Although not mainstream in introductory STEM

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courses, the literature is replete with instructional models that effectively support student performance and retention in various introductory settings. For example, authors have designed introductory STEM course activities that aim to develop students' skills for self-regulated learning, build their networks of learning resources, and socialize them to intellectual communities (Ryan & Glenn 2004; Tinto, 1993; McGinley and Jones, 2014). In recent years, growing acceptance of educational technology has vastly expanded options for coordinating student-centered learning in college classrooms, especially impacting large-enrollment courses (Lee, Morrone, & Siering, 2018). Digital technologies enable new forms of student-driven, active, collaborative learning not only in traditional, centralized classroom settings but also in distributed and distance education (Xiao, 2018). As the higher education system incorporates new technologies and adapts to changing student needs, few recent authors have re-examined how to craft early experiences in introductory courses that support student performance and retention (Lane et al., 2021). Because the characteristics of introductory STEM courses and their student populations vary tremendously across departments, institutions, and disciplines, the first-day or first-week experience is likely a highly-contextualized phenomenon requiring in-depth, multi-layered description.

Purpose and Research Questions

This case study describes a place-based blended learning activity called "UW--Madison Animal & Dairy Science: The Welcome Tour" we designed to assist learners in orienting themselves geographically, socially, and culturally as they begin a large-enrollment introductory course, while fitting the practical needs of our instructional team. Our research centered on one exploratory and one descriptive question:

1. What elements of the activity design and implementation did our students and instructional team perceive worked well, and what should be explored in future research?
2. To what extent did the activity accomplish its objectives to 1) orient students geographically to facilities used in labs, 2) facilitate social bonding, and 3) increase awareness of prominent cultural-historical themes in the Animal & Dairy Sciences Department?

Materials and Methods

Instructional Design Framework

Onboarding

In this case study, we borrow the organizational psychology term "onboarding" (e.g., Bauer & Erdogan, 2011) to describe instructional efforts that support learner integration into unfamiliar geographic, social, and/or cultural contexts as they begin a course of study. This positions onboarding as an early intervention in the longer-term project of supporting undergraduate performance and persistence (Kerby, 2015; Tinto, 1975). Onboarding activities may aim to support students in self-contextualization, for example, reflections designed to cohere autobiographical understanding and develop vocational identity (Habermas & Bluck, 2000). Onboarding may also aim at building self-regulated learning skills through practice and explicit instruction (Roberson, 2018), strengthening social ties and supporting social belonging (Turetsky et al., 2020), and connecting with on-campus or external learning and information resources (Hungerford et al., 2021). By altering students' experiences as they transition into a course of study, onboarding attempts to soften negative psychological responses to change and instead take advantage of the transformative learning potential of disorientation (Chow & Healey, 2008; Raikou, 2018). Research has shown that targeting student academic, social, and personal integration with onboarding activities has clear benefits on their motivation and performance throughout undergraduate study (Dika & D'Amico, 2016; Ryan & Glenn, 2007; Walton & Cohen, 2011). Evidence suggests that effectiveness of onboarding activities varies based on the types of activities and the learners' characteristics. For example, researchers have found that onboarding activities yielded larger positive effects on retention and performance for those in historically excluded groups and first-generation college students, compared with respective reference groups (Jamelske, 2009; Leary et al., 2021). Onboarding activities also drastically shaped the reported experiences of transfer students (Townsend & Wilson, 2006). This evidence indicates that in the context of introductory courses, which convene richly varied groups of novice learners, onboarding is critical not only to supporting the performance of individual students, but also to creating an equitable and inclusive social learning environment.

Place-based learning

The concept of onboarding lies at the intersection between an individual and their geographic, social, and cultural environments—in other words, their situatedness or "rootedness" within a place. Theories of humanistic geography contrast "spaces" which are objective and material locations, with "places," which additionally include the socially constructed meanings ascribed to locations (Agnew, 2011; Ujang & Zakariya, 2015). Place is therefore enacted, embodied, and experienced by people in both individual and collaborative ways.

Although place-based learning has been discussed as an entry-point to teaching concepts across the curriculum and often conveys disciplinary content, instructors can leverage person-place interactions as the entry-point for transformative learning, i.e., learning that shapes individual and/or collective identities (Pisters et al., 2019; Sobel, 2004). Place experiences prompt affective, cognitive, and behavioral processes that influence the individual's personal and social identities and goals (Steele, 1981). For example, strong attachments to place can crystallize into aspects of an individual's identity where they become robust predictors of behavior (Bott et al., 2003). Shared place experiences can facilitate the formation of social bonds (Johnson et al., 2020). Place-based learning also has implications on learners' integration with and transmutation of organizational

cultures. Lim (2010) argued that place-based learning that affirms the multiplicity of place histories in a given context can support students' intercultural skills and promote inclusivity. These findings suggest that learning centered on campus places can nudge behavioral and psychosocial processes affecting learners' integration in their physical and social environment and their perceived "sense of place" (Kerby, 2015).

In introductory courses, virtually all students are transitioning to a new field of study, and many students (i.e., first-year and transfer students) may additionally be transitioning to university life (Chow & Healey, 2008). These conditions challenge the "sense of self-in-place" which can undermine the individual's psychological security and impede their integration into new learning environments (Cantrill & Senecah, 2001; Wang et al., 2019). Conversely, evidence suggests that place-based onboarding activities can promote introductory learners' psychological security and integration by grounding their identity and experience in a local socio-spatial context (Scannell & Gifford, 2017).

Blended learning

Following Garrison and Kanuka (2004), we defined blended learning as the combination of in-person experiences with internet-mediated learning. Whereas in-person learning requires the synchronous physical co-presence of a group of learners and their instructor, and whereas distance learning is entirely internet-mediated with no physical co-presence, blended learning is inclusive of a broader range of learning situations: synchronous or asynchronous, and physically-present or distance-learning (Oliver & Trigwell, 2005). Because this definition is so broad as to include nearly all forms of modern undergraduate instruction, researchers have emphasized the need for description of blended learning to detail the quality and quantity of blending between instructional modes and the level of operation (e.g., activity- versus course-specific blending; Hrastinski, 2019). Graham (2006) discusses qualitative differences in the ways instructors select elements of learning to occur via on-line versus in-person modes, and on the ways these elements coalesce in the learning environment. In contrast, many universities defined blended learning administratively based on the quantitative proportion of course time or course content occurring online in relation to in-person instruction (Allen & Seaman, 2010). As educational technology increasingly permeates higher education, the boundaries between in-person, blended, and fully-online learning have blurred (Dahlstrom & Bichsel, 2014; Martin et al., 2020). Recently, the COVID-19 pandemic accelerated instructor and institutional adoption of blended and online learning techniques (Lee & Jung, 2021). In the post-pandemic-onset world, blended learning activities may match the needs of both students and instructors more than fully-online or traditional in-person instruction (Erickson & Wattiaux, 2021). Blended instructional modes can complement place-based learning by promoting deeper, more autonomous, more collaborative engagement of students with places (Hagood & Price, 2016).

Context: Onboarding in Introduction to Animal Agriculture

For students embarking on an Animal & Dairy Science (AnDySci) trajectory, the agricultural campus at our land-grant university forms a rich landscape of practical opportunities in related coursework, extra-curricular activities, and employment. In addition to signifying future opportunities, the campus geographic context also serves as a window into the AnDySci department's historical significance. For example, locations on the agricultural campus can signify famous historical or modern scientific discoveries. Finally, places on campus can communicate the agricultural campus organizational culture by signifying its important norms, values, and symbols.

In contrast to the learning strategies and academic socialization models outlined by Ryan & Glenn (2004), our introductory course aligns with the discipline-based theme model of introductory course described by Porter and Swing (2002). The majority of course time is dedicated to previewing subspecialities that both represent options within the major at our institution and previewing areas of engagement in the broader disciplinary community. Students are predominantly first-year and predominantly pursuing AnDySci majors. The course meets three times weekly for one 50-min. lecture, and once weekly for a 3-hr laboratory. Our class size averages 90-100 (two laboratory sections of 40-50), which can pose logistical challenges for our small instructional team (one faculty associate and two to four graduate and undergraduate laboratory teaching assistants). In part to overcome logistical constraints, the instructional team historically allocated 20-50% of lab time to student-driven activities requiring minimal guidance from our instructional team.

Our instructional team perceived constraints including limited class time for non-content learning and a large student-instructor ratio. Additionally, we required the activity to accommodate both synchronous, in-person participants for the main course session as well as asynchronous and/or virtual participants. The proximal objectives of this activity were to 1) orient students geographically to facilities we would use in their introductory course labs, 2) facilitate the formation of social and professional relationships among small groups of classmates, and 3) build awareness of prominent cultural-historical themes in the department for students to understand and challenge.

Case Study Design

This single-case report describes the "UW—Madison Animal & Dairy Science: The Welcome Tour" activity as implemented in our AnDySci 101 course. Table 1 shows a timeline of major teaching and research events in the case study. We used an embedded mixed-method design with two complementary sources of data (Creswell, 2005). First, the first author's qualitative personal account as an instructor-designer documents the activity's design process and implementation in both the fall 2020 and fall 2021 semesters. Second, an embedded quantitative survey describes student learning outcomes and perceptions of the activity in the fall 2021 semester. Whereas the personal

Table 1.

Timeline of teaching and research activities related to the Welcome Tour design and assessment.

Term	Teaching Events	Research Events
Summer 2020	• Designed and tested the Welcome Tour within instructional team.	• Recorded design process and considerations.
Fall 2020	• Students (N = 80) offered the Welcome Tour as an individual self-guided asynchronous activity due to ongoing COVID-19 restrictions. • Students submitted videos at a destination of their choice introducing themselves to peers.	• Collected qualitative data throughout the semester. • Instructional team discussed findings.
Summer 2021	• Updated the Welcome Tour instructions to accommodate for in-person, synchronous instruction. • No changes made to the tour destinations or map.	• Made notes justifying activity design changes.
Fall 2021	• Students (N = 94) offered the Welcome Tour as a peer-group-led activity during the final 1.5 hr of the first synchronous 3-hr in-person laboratory session of the semester. • Following ice-breaker activities, students completed the tour and submitted group photos at each location to a secure drive.	• Collected qualitative data during the semester. • Administered quantitative survey at the end of the semester. • Instructional team discussed findings.
Spring 2022	• None	• First and second author discussed the aggregated qualitative and quantitative results as a research team to decipher main findings.

account is descriptive and inductive, the student survey is deductive. The co-analysis of these multiple, complementary data sources offsets potential weaknesses associated with each data collection method (Yin, 1994). Likewise, the choice of case study method allows for richer contextual description and accommodates greater complexity, making it suited to studying onboarding, which encompasses a wide range of instructional activities inextricable from the course, departmental, and institutional context.

Instructional Design Methods

To create the Welcome Tour StoryMap, the first author started by designing the tour on paper, selecting 12 important locations for students interested in animal science. For example, the tour included buildings such as campus animal facilities, the Vet School, a life sciences library, and the dairy and meat retail stores. Then, the locations were arranged into a logical order, such that students could safely walk on sidewalks and crosswalks and complete the tour as a large loop with minimal backtracking.

Then, the Welcome Tour was designed onto an ArcGIS StoryMap (https://storymaps.arcgis.com/). To generate a web map, we marked locations and set navigation boundaries on an open source "community basemap" available through ArcGIS. For the StoryMaps layout, we selected a side-by-side option (Figure 1). In this layout, a map of numbered destinations pans and zooms in response to scrolling in a sidebar. Conversely, the sidebar responds when a viewer clicks a destination on the map. The sidebar contained a vertical list of 12 descriptive boxes—one for each destination. Each descriptive box included 30-70 words summarizing the relevance of the location to current students and sharing historical "fun facts." To be inclusive of all our students (including some with mobility restrictions or in quarantine), we optimized the Welcome Tour activity both for mobile devices as an in-person walking tour, and for personal computers as a fully-virtual activity. Our AnSci 101 Welcome Tour StoryMap is viewable here: https://arcg.is/1HK4uS .

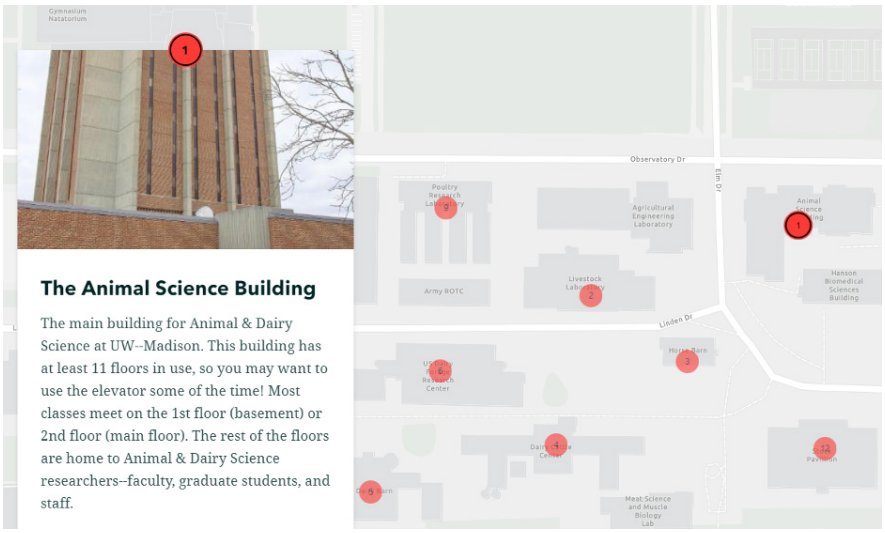
Our instructional team has used this activity in two recent years as a component of the first course laboratory. In Fall 2020 we tested this activity as an individual self-guided, self-paced activity due to COVID-19 restrictions with N = 80 students. We posted brief instructions and a link to the activity on our learning management system. To add collaborative and assessment elements, we invited students to submit a brief 1- to 2-minute video at a destination of choice introducing themselves and to comment on the videos of their peers (FlipGrid Inc., Minneapolis, MN). We awarded 3 pt. for completion, representing 0.2% of total pt. available in the course.

In Fall 2021, we offered the Welcome Tour activity as a peer-group-led activity during the final 1.5-hr of the first 3-hr synchronous in-person laboratory session of the semester with N = 94 students. During this lab, students chose their seats at round tables and we provided them adhesive nametags. After a 40- to 45-min. interactive lecture on policies and procedures for course laboratories, we assigned small groups (4-6 students) based on physical sections of tables. They then completed several ice-breaker activities (40-45 min.) in which they introduced themselves to group-mates, worked collaboratively on an open-ended creative project, and set goals for the course. Subsequently, we

PLACE-BASED BLENDED WELCOME TOUR

Figure 1.

Side-by-side layout showing a description box for a tour destination and the basemap with additional numbered destinations.



reconvened the entire class to explain the tour procedures (3-5-min.). Students accessed the tour by scanning a QR code projected on classroom display screens. We assigned each of the 12 groups to start at a tour destination corresponding to their group number. As an assessment, we offered students laboratory participation if one group member submitted an informal photo of their group at each of the 12 locations to a secure drive. With student consent, we added these photos to our class's shared photo album on our learning management system. We intended this low-stakes, low-input participation assessment to promote identification with and entitativity of social groups at the small group and full-class level.

Case Study Research Methods

Qualitative personal account procedures

The first author's personal account was based on observation and interpretation of events and records representing student and instructor participants in the Welcome Tour activity. Student sources included student behavior before and after the activity, student media submitted as the assessment, informal feedback from students during the semester, and formal feedback from students in the regular course evaluations at the end of the semester. Sources related to our instructional team included the first author's personal experience and feedback from regular debriefing with others on the instructional team. Due to the activity design, no one accompanied individual students (Fall 2020) or student groups (Fall 2021) around campus to directly observe their experience during the activity. To document qualitative data, the first author kept detailed notes on any phenomena judged as relating to the tour activity under the arbitrary headings of "design" and "implementation." Throughout the semester, the first author continually referred to her notes to add detail or personal reflections. Finally, in Spring 2022, the first author discussed her notes and reflections with the second author--an experienced undergraduate instructor--to determine the main findings.

Quantitative survey design and administration

We did not quantitatively assess the initial iteration of the Welcome Tour activity in Fall 2020. In Fall 2021, we administered a brief evaluation of the Welcome Tour activity's second iteration. The Institutional Review Board approved all study procedures. We created four total survey items: three items with anchored scales (5-pt. scale "not at all [1]" to "extremely [5]") based on the activity's three learning objectives, and a single multiple-choice item asking students if they believe the tour should be retained or dropped from the course (options: "I believe the Welcome Tour should be replaced with another activity;" "I believe the Welcome Tour should remain a part of Lab #1;" "I am neutral or unsure;" "Other [please explain below]"). We included these four items in the regular end-of-course evaluation administered online via Qualtrics (Qualtrics Inc., Provo, UT). Timing the survey at the end-of-semester (week 14) rather than immediately following the activity (week 1) was intended so that students would report their reflections on the activity effectiveness in light of their experience throughout the semester. On the final week of regular course sessions (week 14), the instructional team opened the survey and offered students two days to complete it individually outside of class. Our research team notified students they would be awarded 0.5% extra credit for survey completion and that their responses would be de-identified and not seen by instructors until after the semester ended to encourage their honesty (Shenton, 2004).

Results and Discussion

Instructor perspective and personal account

With respect to the design of the Welcome Tour content, we did not perceive a need to make substantial changes, though the cloud-based hosting and easy-to-use editor would make modifications straightforward. We

found students effectively used the map to navigate around campus in both iterations of the activity. Although we have considered expanding the descriptive text for each location, the first author observed that students typically completed the tour using mobile devices. Additional descriptive text might be beneficial for a fully-virtual participant who does not visit campus locations. However, the first author's experience suggested that students completing the tour on-campus and in peer groups prefer concise text descriptions (<100 words) that do not detract from their experience of place and collaboration with peers.

Regarding implementation, we noticed several important considerations for our context. First, we felt the interactivity of the Welcome Tour effectively complemented the tedium of covering course policies in the first part of the lab session. Second, we found it important to maintain the order of activities: introductions, syllabus and course policies, then finally the Welcome Tour activity. By communicating critical course information early in the lab session, it avoided the need for a hard deadline for students to finish the tour activity. We believe this promoted deeper engagement and circumvented potential problems associated with coordinating the return of small groups to the classroom. Third, it occurred to us that weather conditions could threaten the efficacy of the tour activity if no contingency plans were made. So far, weather conditions have not obstructed students from completing the tour during lab hours. As a contingency, students could complete the activity on their own time (as in Fall 2020) or synchronously in small groups without leaving the classroom. Fourth, the first author noticed that the Welcome Tour facilitated more social bonding when offered in a peer-group-led synchronous format in Fall 2021 compared with the individual asynchronous format in Fall 2020. In addition to the format of the Welcome Tour itself, the observed differences in social bonding could also be related to the format of the preceding lab session. The Fall 2021 Welcome Tour was conducted following 1.5 hr. of synchronous in-person lecture and activities in the same peer group, whereas the Fall 2020 group followed 1.5 hr. of synchronous emergency remote lecture and activities. To improve the social dynamics, we have considered devising a method to intentionally design student small groups ahead of class or including more team-building elements the requirements for the activity. Finally, we took note of a few considerations related to the low-stakes assessments used. In Fall 2020, student submissions communicated enthusiasm about submitting videos to introduce themselves and document the tour. Likewise, in Fall 2021, we found student picture submissions were wonderfully expressive. In both iterations, >95% of enrollees completed these assignments. By design, this media submission assignment is a relatively relaxed assessment component intended to convey to students that they should focus on experiencing rather than performing. However, our instructional team has considered increasing the difficulty and complexity of the assignment with the goal of promoting positive interdependence of group members and setting high academic expectations for the semester.

Fall 2021 student survey

Table 2 shows student responses to the quantitative survey in Fall 2021. In total, 80 of 94 students completed the Welcome Tour evaluation survey (response rate: 85.1%). In anchored scale ratings assessing learning outcomes, students reported that the tour was "very helpful" to orienting themselves to the animal and dairy science buildings on campus (M = 4.0, SD = 0.9); "moderately" to "very" helpful to forming social and professional relationships with classmates (M = 3.5, SD = 1.1); and "moderately" helpful to gaining a sense for the Animal & Dairy Sciences department's cultural and historical background (M = 3.2,

Table 2.

Perceptions of Fall 2020 introductory animal sciences students (N = 80, response rate = 85.1%) on a place-based, blended laboratory activity titled the "Welcome Tour."

Item	Response Summary
To what extent was the Welcome Tour helpful to:	Mean (SD)
Orienting yourself to the animal and dairy science buildings on campus	4.0 (0.9)
Forming social and professional relationships with your classmates	3.5 (1.1)
Gaining a sense for the Animal & Dairy Sciences department's cultural and historical background	3.2 (1.3)
Do you believe the Welcome Tour should continue in future years?	Count (%)
Should be retained in future years	64 (80.0)
Neutral/unsure	10 (12.5)
Other	3 (3.8)
Should be replaced with a different activity	3 (3.8)

Note. 15-pt. anchored scale "not at all [1]" to "extremely [5]")

SD = 1.3). Most students supported retaining the Welcome Tour activity in future years (n = 64; 80.0%), although a small fraction indicated they were neutral or unsure (n = 10; 12.5%) or "other" (n = 3; 3.8%), or that the Welcome Tour activity should be replaced with a different activity (n = 3; 3.8%).

In aggregate, these results indicated that the Welcome Tour activity met learning objectives and student expectations. Still, results suggested areas for future investigation and refinement related to students' development of social and professional relationships in small groups and their cultural-historical learning. For example, future research could compare different group selection, composition, or facilitation strategies for this Welcome Tour or similar activities (Borges et al., 2009; Jensen & Lawson, 2011). Additionally, teacher-researchers could pilot test different versions of the activity to refine the descriptive text and facilitation components aimed at developing a sense of the department's cultural and historical background while affirming multiple place-histories and cultural identities (Lim, 2010). Learners' sense of belonging (or conversely, of alienation) may be a key outcome for further investigation as it is implicated in both social bonding and cultural-historical learning (Kaplan et al., 2020; Thomas, 2016).

Limitations & Extensions

Research Design

The credibility, transferability, dependability, and confirmability of the qualitative components of this case study rest upon a detailed account of context, instructional design methods, research methods, and positionality, as well as the use of complementary quantitative data (Creswell, 2005). The first author's close proximity to the phenomena under study allowed for the formation of a detailed contextual description, however, her personal account is inextricable from her positionality as the activity designer and facilitator during both semesters. Other participants were naturally aware of her involvement in activity design, facilitation, and course evaluation which may have biased certain qualitative data sources in this case study, especially informal feedback. Similarly, the first author's interpretation of the qualitative data stemmed from her involvement in scholarship of teaching and learning as a graduate teaching assistant and laboratory instructor. Future qualitative inquiries could incorporate student interviews and focus groups to characterize students' experience in greater detail. This additional data would allow triangulation, member checking, iterative questioning, negative case analysis, and other provisions to enhance qualitative trustworthiness.

Similarly, the quantitative results of this case study have important limitations in credibility, transferability, dependability, and confirmability. History and maturation effects may have affected the case study results because the case study examined a single group of students, i.e., the Welcome Tour was not compared to other different onboarding approaches. Additionally, although <5% of students dropped the course after the first lab, the quantitative survey includes results only from students who completed the entire semester course. Additionally, measurement reliability and validity could not be assessed due to the use of single-item measures. Finally, participants in the quantitative survey were assessed at a single timepoint. Whereas cross-sectional assessments have been suggested to avoid response shift bias and compounding measurement error from two or more separate assessments (Little et al., 2019), single-timepoint data represent a brief window into participants' experience that may not be representative of their longitudinal outcomes. Future studies could assess students at more time points during the semester, develop valid measures of activity-specific student outcomes, adapt established measures of psychosocial adjustment outcomes, and/or use institutional data sources to track performance and retention longitudinally.

Instructional Design

Although ArcGIS StoryMaps has many possible extensions, the Welcome Tour described here is limited by our instructional team's particular objectives and context. First, the first author designed the Welcome Tour activity for first-year students with little campus familiarity. Other adaptations of the activity could consider the unique needs of more experienced students, who may prefer opportunities for individual learning and have a greater comfort level navigating campus. Second, our desired destinations spanned 12 locations across several city blocks of campus. When important destinations are constrained to a smaller geographic region, e.g., a single building, an ArcGIS StoryMap is less likely to be helpful. It may be possible to overcome this challenge by creating a custom basemap, however, open-source community basemaps are typically two-dimensional and detail the regional geography with building outlines, and no description of building interiors. Finally, our institutional license for ArcGIS allowed free access to the StoryMaps platform. For instructors who lack institutional access, it is possible to purchase an individual license for ArcGIS StoryMaps (https://www.esri.com/en-us/arcgis/products/arcgis-storymaps/buy, retrieved 2021.09.14). If StoryMaps is not available, Google Earth Creation Tools is an open-source alternative that supports creating map-based narratives, though with fewer features (https://www.blog.google/products/earth/new-google-earth-creation-tools/, retrieved 2021.09.14).

Aside from a campus-located Welcome Tour, there are numerous ways to use ArcGIS StoryMaps in agriculture teaching. Rather than campus locations, instructors could use global locations. StoryMaps can be built around complex basemap layers of topography, satellite imagery, administrative boundaries, and other natural and human-made features. Using the StoryMaps layout options, instructors can pair any type of map with various media, slideshows, and interactive elements. Beyond StoryMaps, technically-savvy instructors could use location-based augmented reality to build even more-immersive experiences. More practical instructors could blend StoryMaps with physical objects (e.g., hidden envelopes or prizes) to create a discovery journey. Our Welcome Tour represents a simple, easy-to-enact use case within the context of post-secondary agriculture; however,

the StoryMaps website contains hundreds of examples illustrating additional possibilities.

Conclusions

Overall, end-of-semester survey results indicated that the place-based blended Welcome Tour tested in this research accomplished three important introductory course learning outcomes: 1) it helped students locate important campus facilities, 2) it facilitated the development of peer-to-peer social and professional relationships, and 3) to some extent, it introduced students to AnDySci department's cultural heritage. Future longitudinal research is needed to fully-understand the theorized distal impacts of this and similar place-based blended learning experiences on first-year students' academic performance and retention. These results showed that instructors can use ArcGIS StoryMaps and similar platforms to mediate place-based blended activities for introductory student onboarding.

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