8-19-2024

Evaluating a Web-Based System for Tracking Public Health Practice Experiences: User Perceptions, Challenges, and Recommendations for Technology Improvement

Matthew McGrievy
University of South Carolina

Evaluating a Web-based System for Tracking Public Health Practice Experiences: User Perceptions, Challenges, and Recommendations for Technology Improvement

by

Matthew McGrievy

Bachelor of Arts
Miami University, 1997

Master of Library and Information Science
University of Texas, 1998

Submitted in Partial Fulfillment of the Requirements

For the Degree of Doctor of Education in

Educational Practice & Innovation

College of Education

University of South Carolina

2024

Accepted by:

William Morris, Major Professor

Fatih Ari, Committee Member

Yingxiao Qian, Committee Member

Marshall Jones, Committee Member

Ann Vail, Dean of the Graduate School

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my dissertation chair, William Morris, for his patience, reassurance, guidance, and all-around good advice throughout both the doctoral program and the dissertation process. I would also like to thank members of my committee, Drs. Fatih Ari, Marshall Jones, and Yingxiao Qian for their support and mentorship. I am also extremely grateful to Dr. Lee Pearson for his encouragement, professional advice, and friendship along the way.

Finally, I would like to thank my wife, Brie, for her endless support in keeping our lives on track over the last few years. She tolerated countless nights and weekends of me doing schoolwork and made sure we had fun during my times off. I probably would not have started my doctoral education without her encouragement and certainly would not have finished.

ABSTRACT

The purpose of this descriptive action research study was to evaluate the web-based practice experience tracking system at a school of public health (SPH) at a large southeastern university. Applied practice experiences (APEs) are a key component of public health education, and schools and programs of public health in the United States must provide documentation of APEs and practice-related activities to meet accreditation standards. A descriptive action research evaluation examined how users perceive and use the existing web-based system designed to document APEs in the SPH. Research questions investigated what factors influence the use of the existing system, identified challenges users face when using the system, and focused on recommendations for improvement in tracking practice-based experiences using the web-based system.

The research design is a descriptive evaluation that uses a convergent mixed methods approach where qualitative and quantitative data were collected simultaneously from students, faculty, and practitioner partners of the SPH. Semi-structured interviews were used to gather qualitative data from 8 participants and a survey was used to gather quantitative data from 82 respondents. The Unified Theory of Acceptance and Use of Technology (UTAUT) and the User Burden Scale (UBS) served as the theoretical basis for the semi-structured interviews and the survey. Quantitative and qualitative results indicated overall positive perceptions toward constructs related to perceived usefulness, ease-of-use, social influence, and user burden. Overall attitude toward the system was rated most negatively by participants. Research findings can serve as a guide for other

schools and programs who are required to document and report on practice-based learning to meet accreditation requirements.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

National Context

Applied practice experiences (APEs) are a critical tool for public health students to enhance learning, build professional networks, address gaps in skills, and offer support during public health emergencies (Baukus, 2019; Chengane et al., 2020; Hernandez et al., 2014). Because of their importance to public health education, the Council on Education for Public Health (CEPH), which serves as the national accrediting body for schools and programs of public health in the United States, specifies APEs as a required accreditation criteria (Council on Education for Public Health, 2016; Krisberg, 2017). To fulfill APE accreditation requirements, CEPH (2016) mandates that schools and programs provide evidence that students have attained foundational and concentration-specific competencies at "governmental, non-governmental, non-profit, industrial and for-profit settings or appropriate university-affiliated settings" (p. 21) that are mutually beneficial to both the academic and partner organization. Thus, building, maintaining, and tracking partnerships among the types of organizations that offer students the ability to learn via APEs is a critical component for maintaining accreditation for the 245 schools and programs accredited by CEPH in the US and internationally (Accreditation Statistics - Council on Education for Public Health, n.d.).

Programs and schools often form mutually beneficial partnerships with public health community organizations that can serve as APE sites and provide opportunities for

practice-based learning (Wrye et al., 2019). One such formal arrangement involves a memorandum of understanding between the school or program and local- or state-level governmental agencies called an academic health department (AHD) (Hamilton et al., 2014). Erwin and Keck (2014) define an AHD as an "arrangement between an academic institution and a governmental public health agency, which provides mutual benefits in teaching, research, and service, with academia informing the practice of public health, and the governmental public health agency informing the academic program" (p. 270). Partnerships with non-profit and other non-governmental sites that have less formal documentation on specific initiatives and activities are also common and can offer additional options for learning experiences.

One challenge for health sciences schools and programs is designing a centralized electronic system that not only facilitates experiential learning, but also provides sufficient evidence that accreditation criteria have been met (Bair et al., 2019; Dawn et al., 2011). ePortfolios are one type of electronic system that have been used across disciplines in higher education to document attainment of discipline-specific competencies that could help address these goals (Harver et al., 2019). Lorenzo and Ittelson (Lorenzo et al., 2005) define ePortfolios as "a digitized collection of artifacts including demonstrations, resources, and accomplishments that represent an individual, group, or institution" (p.1). ePortfolio approaches in higher education have evolved over the past 30 years and questions still remain about best practices related to features, format, and artifacts to be collected to best suit the needs of educators and students (Farrell, 2020). Despite the variety of approaches, an investigation into incorporating

specific features and functionality of successful ePortfolio systems when considering the design of a larger system to track APEs and practice collaborations should be considered.

An additional challenge for schools and programs of public health is building and maintaining the network of community partners and practice organizations that serve as APE sites (Varda et al., 2012). Without proper tracking of activities, preceptor contacts, and collaborations, maintaining a mutually beneficial relationship with each organization becomes more difficult. An evaluation that provides specific recommendations for an electronic system incorporating ePortfolio features and other functionality relevant to schools and programs of public health, such as partner network management, could assist CEPH-accredited programs in maintaining not only accreditation, but also meaningful partnerships with community organizations focused on public health.

Local Context

The *2021 Blueprint for Academic Excellence* for a school of public health (SPH) at a large, public university in the southeastern United States serves as the strategic plan and lists two primary challenges for undergraduate and graduate experiential learning: 1) a limited number of degree-appropriate placements among the network of the SPH's community partners, and 2) the maintenance and cultivation of the SPH's network of partners to maintain a consistent pool of practice opportunities (Arnold School of Public Health, 2021). The SPH currently tracks APEs and its network of community partners using a system called My Source for Public Health (MySPH), which has a number of features common to ePortfolios. MySPH (https://mysph.sc.edu) was developed over four years and released in 2012. In its original form, the system was intended to track all APEs and practice collaborations within the SPH, including professional exchange and student

placement activities, research collaborations, workforce development, public health events and news, practice site contact information, and competencies attained by students through practice-based experiences (Smith et al., 2014).

Website analytics collected internally by the school have shown that from 2018 to 2021, site usage has declined year over year, with a combined decrease of 26% in the last three years. Site usage is currently at its lowest level since 2013 and could indicate a drop-off in use among preceptors especially. Preceptors are public health professionals at partner sites who serve as student supervisors and mentors during the APE process (Kemper et al., 2004). SPH faculty, staff, and students are required to use MySPH to track APEs and that segment of the stakeholder population has remained relatively constant since 2013. Further investigation into whether the decreased usage may disproportionately affect preceptors, as well as a closer look at user perceptions and satisfaction, should be included in a larger evaluation of how MySPH is meeting the needs of all stakeholder groups. Decreased usage of MySPH and dissatisfaction could indicate that the system is no longer contributing to the goal of cultivating partner networks and practice opportunity sites.

As MySPH has evolved over the years and requirements have changed, many of the original features have been disabled or removed. For example, competency tracking, which was one of the original core features and is used as evidence for accreditation, was partially removed in 2016. Changes to the system have been ad hoc and the impact on each stakeholder group has not been considered in a systematic way. In its current form, MySPH essentially is a portal for public health practitioners to post, and for students to apply for, practicums, graduate assistantships, internships, as well as other training

opportunities. While that functionality is still useful and allows the system to serve as a tracking system for practice experiences in the school, MySPH is not being used as originally intended and not meeting the strategic aims of the school. A re-evaluation is needed to make recommendations on how it could better meet the needs of faculty, staff, and preceptor stakeholders and guide development of a replacement system.

In my role as the Director of Information Services, I am responsible for troubleshooting, supporting, and maintaining MySPH. Over the past five years, the system has become increasingly unwieldy and difficult to support. Due to MySPH's age and the technology infrastructure chosen in the original design, modifications and updates are not usually possible, and there is a long list of outstanding feature requests that cannot be addressed. To meet the challenges of supporting practice-based learning, nurturing partner networks, and maintaining a pool of practice sites, a systematic evaluation that considers the input of all stakeholders has become necessary.

Statement of the Problem

Faculty, staff, students, and preceptors at a school of public health (SPH) at a large, public university in the southeastern United States have expressed dissatisfaction with the system currently used to track applied practice experiences (APE) and academic-practice partnership activities.

Purpose Statement

The purpose of this descriptive action research was to evaluate the practice experience tracking system and make recommendations for improvements to document and report on APEs and academic-practice partnership activities that satisfies accreditation criteria, uses up-to-date technology, and meets the needs of all stakeholders.

Research Questions

1. What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and preceptors?
2. What challenges do students, faculty, and preceptors face when using the current web-based system?
3. What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?

Statement of Researcher Subjectivities and Positionality

I am a technology professional who has been working in various universities for the past 20 years; first as a librarian, then in IT support, and finally as a project manager and technology developer in my current position. My parents were both teachers and as I was pursuing my undergraduate degree in English, I expected to be an English teacher myself. My career path took a turn, however, when I began working in a library during college and decided to pursue my Master of Library and Information Science degree instead. As a librarian, I enjoyed working with people to help them find information and solve their problems. An affinity for technology and that same desire to help people put me on the path to becoming a computer services librarian and then an IT support specialist.

My job has evolved over the years from being very much focused on IT desktop, hardware, and server support to project management and development of IT solutions. Even though I do not have an educational background in public health, I have worked in schools of public health for the last 18 years. I think of myself as a problem-solver and

my projects have included developing learning management systems, databases, websites for researchers, and multimedia resources for faculty, staff, students, and others at the university. As I develop more solutions to support teaching and learning, my hope in pursuing an EdD was to develop a stronger foundation in educational theory and to gain a degree that relates specifically to my current job.

Pragmatism is the paradigm that best fits my research. I like the focus on an applied approach to finding solutions to problems. Creswell (2014) describes pragmatism as a focus on "what works" and notes that pragmatists are concerned with applications of knowledge and finding solutions to problems. Pragmatism is also concerned with establishing "shared meanings" and "joint action" in research as researchers and participants work together toward common goals (Morgan, 2007). The pragmatic paradigm fits well with my research topic of exploring how to improve the current practice experience tracking database within my school and it aligns with project management approaches on which I have been trained. I also like that it can draw on whichever qualitative or quantitative tools are necessary and best fit the research problem at hand. From both a professional and personal perspective, pragmatism appeals to me and feels like a natural approach.

In terms of positionality, my research falls closest to reciprocal collaboration (insider-outsider teams) in that I am mostly an insider in terms of my position within the organization and hierarchy, but I am an outsider in other ways (Herr & Anderson, 2014). My participants were my colleagues, and in some cases, my friends, which positions me as an insider. I am an outsider, however, with respect to how the particular system I am studying is used: how my participants view it, how it contributes to their ability to do

their jobs, how well supported they feel, and how motivated they are to use it. My participants and myself had shared goals (improved technology and practice) but were likely coming at the problem from different perspectives (technologist vs. public health professionals and academics).

The system I researched and hope to improve is one that I was originally hired to design and launch 13 years ago. I am personally invested in the current system, and I find myself frustrated that it is not working in the way it was intended. In addition, I am highly motivated to improve it and would like to bring project management and systematic planning to the design of the next system. I think the best way for me to negotiate my positionality was to continually reflect on my role as a professional and researcher and take a reflexive approach that acknowledges my values and biases. In thinking through methods and the research process, it was important to be self-aware and keep positionality in mind as a central component when making decisions or evaluating my approach. I needed to make sure that I stayed neutral and elicited information from participants rather than imposing my values or attempting to guide the research.

Definition of Terms

Academic health department: Erwin and Keck (2014) define an academic health department (AHD) as an "arrangement between an academic institution and a governmental public health agency, which provides mutual benefits in teaching, research, and service, with academia informing the practice of public health, and the governmental public health agency informing the academic program" (p. 270).

Applied practice experience: An applied practice experience (APE) is defined by The Council on Education for Public Health (2016) to include practicums, internships,

course-based activities, activities linked to service learning, co-curricular activities (such as volunteer opportunities), and experiences that offer a blend of for-credit and/or not-for-credit activities. In addition, APEs allow students to attain foundational and concentration-specific competencies at "governmental, non-governmental, non-profit, industrial and for-profit settings or appropriate university-affiliated settings" (p. 21) and should be mutually beneficial to both the academic and partner organization (Council on Education for Public Health, 2016).

ePortfolio: ePortfolio (or e-portfolio) is defined as a purposeful collection in an electronic format of student work that demonstrates effort, progress, artifacts, and achievements in a given area (Paulson et al., 1991). Key components include student involvement in selection of the portfolio contents, evidence of student reflection, and specificity in the selection of materials to demonstrate growth in learning over time (Habib & Wittek, 2007).

Feature: Kang et al. (1990) define a feature as a "prominent or distinctive user-visible aspect, quality, or characteristic of a software system or systems" (p. 3) Features of web-based systems address operational requirement, needs, and expectations identified by stakeholders during the software design and development process (Bolchini & Paolini, 2002).

Preceptor: In the context of public health education, a preceptor is an experienced public health practitioner who serves as a student supervisor at a practice site (Kemper et al., 2004). Preceptors provide mentorship, hands-on learning, and ethical guidance to students in community settings and work with both faculty advisors and students to

provide meaningful practice experiences for students (Burns et al., 2006; Kemper et al., 2004).

Use frequency: Use frequency is defined by the number of times specific features are used based on web page access times, durations, and counts by individual users to pages containing each feature.

Web-based systems: Web-based systems are defined as Internet-enabled applications that users access via a web browser that have back-end software that support the business strategy and goals of an organization (Lowe, 2003). The use of a browser provides a standard, familiar interface to users and assists with development by reducing the need to develop front-end user interfaces. In addition, web browsers are pre-installed on all modern, consumer operating systems, so web-based solutions rarely require users to download and install specific software.

CHAPTER 2

LITERATURE REVIEW

The purpose of this descriptive action research was to evaluate the practice experience tracking system and make recommendations for improvements to document and report on applied practice experiences (APEs) and academic-practice partnership activities that satisfies accreditation criteria, uses up-to-date technology, and meets the needs of all stakeholders. This study focuses on the following research questions: (1) what factors influence the intention to use or the actual use of the current web-based system by students, faculty, and preceptors; (2) what challenges do students, faculty, and preceptors face when using the current web-based system; and (3) what recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?

This literature review will provide an overview of (a) experiential learning in health science education, (b) importance of documenting practice-based experiential learning, (c) strategies for tracking and documenting practice-based experiential learning, (d) challenges and barriers to documenting practice-based experiential learning, and (e) technology acceptance and use. The first part of the review will focus on the purpose of experiential learning, how and why it is documented, and technology-based strategies to address the issue. The second part will present a framework for a research-based approach to identify challenges and barriers, as well as increase acceptance and use by all stakeholders.

Methodology for the Literature Review

The literature review process focused on three main search topics: (a) practice experiences in public health and the health sciences, (b) tracking and documentation of experiential learning, and (c) technology acceptance and use. The primary databases used for searches were *ERIC*, *Education Source*, *Google Scholar*, *ProQuest Dissertation and Theses Global*, and *PubMed*. For *ERIC* and *Education Source*, searches were limited to peer-reviewed results in English. Books, peer-reviewed journal articles, conference proceedings, and dissertations were preferred over other sources, and more recent materials were preferred over older sources.

Date filters were used in each database to find newer articles as necessary. When a particularly relevant article was found in the *Google Scholar* search results, the "Related articles" and "Cited by" features were used to find other sources and to generate additional keyword search terms. Articles with higher "Cited by" counts were preferred over those with low or no listed counts. Additional sources were also found by examining the bibliographies of relevant materials and searching for those articles by title. Finally, materials from course work, those recommended by faculty, and recommendations from other students provided additional references. For materials that were not available as full text in any of the databases, interlibrary loan was used to request a scanned or hard copy.

Keywords in the following categories were combined, included as quoted phrases with other terms, joined with Boolean AND/OR operators, or searched individually.

Practice experiences in public health: Keywords included practice, experience, experiential learning, reflective observation, abstract conceptualization, assessment, applied, academic health department, public health, health sciences, clinical experiences,

practicum, internship, and residency.

Tracking and documentation of experiential learning. Keywords included competency, competency tracking, accreditation, documentation, learning portfolio, training, workforce development, ePortfolio, and e-portfolio**.**

Technology acceptance and use. Keywords included unified theory of acceptance and use of technology, UTAUT, technology acceptance model, TAM, technology acceptance, usability (and useability), user experience, technology development, educational technology, user burden, perceived ease of use, perceived usefulness, behavior intention, performance expectancy, facilitating conditions, web-based, and web 2.0.

Experiential Learning in Health Science Education

Experiential learning is a key component of undergraduate and graduate training in the health science disciplines and beyond. This section (a) provides an overview of experiential learning theory, (b) discusses how different types of experiential learning are used in health science education, and (c) outlines the importance of fostering successful collaborations for practice-based experiential learning to be successful.

Experiential Learning Theory and Background

Experiential learning theory is rooted in the constructivist belief that the creation of knowledge is based on inquiry, real-world experiences, and the social context where learning takes place (Kolb, 2014). Drawing from the work of John Dewey, Lev Vygotsky, and Jean Piaget, Kolb (2014) defines the experiential learning process as follows: “knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (p. 51). Learning

takes place in a cycle defined by four processes: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Concrete experience is the process of "doing" and gaining experience from a new situation; reflective observation is reviewing the experience and reconciling inconsistencies between experience and understanding; abstract conceptualization is the process of forming new ideas and learning from the experience; and active experimentation is where the learner tries out new ideas and applies what they have learned (Healey & Jenkins, 2007). Concrete experience and abstract conceptualization are "grasping" processes, while reflective observation and active experimentation are "transforming" processes (Kolb, 2014).

Experiential learning activities allow students to take part in the combination of grasping new experiences and transforming them into knowledge in a cyclical pattern of exposure to a new experience, reflection, generating new ideas, and trying those ideas out by experimenting (McLeod, 2017). Students can enter the cycle at any point, and it may repeat several times. Although experiential learning is generally considered to take place outside of the classroom (e.g., as fieldwork), it is commonly applied within the classroom as well (Lewis & Williams, 1994).

Health Science Practice Experiences

As a broad term, experiential learning can take on many forms, including service-learning activities, study abroad, student teaching, and undergraduate research. Because these activities can also take place within the classroom, simulations, lab experimentation, role-playing, group discussions, and case studies can also be considered types of experiential learning (Cantor, 1995; Lewis & Williams, 1994). Within

undergraduate and graduate health science education, however, the predominant form of experiential learning is APEs, which include clinical rotations, practicums, residencies, internships, and other types of placements that occur in a professional context (Hinch et al., 2020; Institute of Medicine, 1988; Mead & Pilla, 2017). APEs are the primary focus of this review.

A key characteristic of health science APEs is that they take place outside of the classroom, often in a setting within the community. Practice-based fields such as medicine, pharmacy, nursing, and public health use APEs to train future professionals in real-world environments, where they can interact with others and apply what they have learned in the classroom (Smith & Crocker, 2017; Tofade et al., 2016). External sites can include hospitals, governmental offices, non-profit agencies, community health sites, business, and other organizations at the local and state level. By enabling students to work with professionals and apply what they have previously learned in their course work, APEs are critical to building discipline-specific skills, knowledge, and competencies (Sastre-Fullana et al., 2014; Smith & Crocker, 2017). In addition, these practice-based experiences are designed to integrate all four phases of Kolb's learning cycle by offering students direct experiences within a community or professional context; providing opportunity for reflecting on what they have learned; finding new approaches to problems within the field; and actively experimenting under the guidance of preceptor and faculty mentors.

When designing APEs, students, faculty, and professional practitioners (called preceptors) work collaboratively to establish learning outcomes, where the work will take place, deliverables, and how knowledge gained from the experience will be demonstrated

and applied (Baukus, 2019). Depending on the discipline, the roles and design process can vary. For example, internships and residencies are generally well-defined and highly structured in disciplines where clinical rotations are a requirement such as medicine, pharmacy, and nursing. In public health however, the student can have more flexibility in selecting the site, preceptor, project parameters, and competencies that the work will fulfill (Villanueva et al., 2011). There is also more variance in the topic area, since public health covers a wide range of health, environmental, and policy areas. In all cases, preceptors are expected to facilitate learning and serve as an active partner at the site to guide students in learning activities, supervise their work, provide on-going feedback and provide expertise for the practice experience (Burns et al., 2006; Young et al., 2014).

Chapman et. al (1992) summarized a list of general characteristics that are common to experiential education that inform the design and goals of health science APEs: the engagement in purposeful endeavors, encouragement of a big picture perspective, the use of reflection, creation of emotional investment, learning outside one's perceived comfort zone, and the presence of meaningful relationships. The combination of all these features in practice-based experiences make them an especially valuable experiential learning tool.

Academic-Practice Partnerships Within Health Science Education

Because APEs take place exclusively outside the classroom with active participation from working professionals, fostering and maintaining external partnerships with placement sites is critical for establishing opportunities for students to take part in APEs. Despite the short- and long-term benefits for students, faculty, and preceptors (Baukus, 2019; Hartwig et al., 2004; Wigington et al., 2017), preceptors often find the

process of serving as a practitioner-teacher for students, while also attending to professional duties, to be time-consuming and difficult (Dodge et al., 2014; Eliot et al., 2018).

As opposed to more clinically focused fields, public health preceptors are somewhat unique in that they do not have consistent licensure, levels of educational attainment, or positions in the organizational hierarchy (Leider et al., 2016). Practitioners serving as preceptors are required to have a minimum of two years of public health experience, but work assignments and the level of seniority can vary. The field of public health also covers a wide variety of sub-disciplines (e.g., epidemiology, public health policy, and health behavior interventions, environmental science), and so serving as a preceptor to design practice-based experiences can be more intensive and time-consuming than in other fields. This is particularly true if students, faculty advisors, and universities are not actively involved in setting goals and objectives.

A common type of academic-practice collaboration that seeks to assist with these challenges is called an academic health department (AHD). An AHD is a partnership between a state health department, a university, and other community partners that attempts to clearly define work, roles, and expectations (Erwin, Harris, et al., 2016). These partnerships can be informal, or they can be formalized by memorandums of understanding, contracts, and agreements. Formalized arrangements assist in setting expectations for both sides and often outline the number of students who will be placed, types of work, and deliverables on behalf of the health department and school (Kovach et al., 2019; Smith et al., 2014).

Most schools and programs of public health in the United States have an AHD

partnership (Erwin, Harris, et al., 2016) and they are often the primary collaborators for serving as placement sites, coordinating research activities, establishing competency-based curriculum, facilitating professional exchange, and establishing workforce development priorities (Erwin et al., 2019; Hilliard & Boulton, 2012; Koo & Miner, 2010). Regardless of the type of relationship, properly maintaining partnerships is an important component of ensuring there will be placement sites available, and that experiential learning is properly designed to meet learning outcomes and the needs of all stakeholders (Erwin, Barlow, et al., 2016; Livingood et al., 2007).

External sites and preceptors must be properly supported, roles and expectations must be unambiguous, and there must be clear lines of communication to ensure healthy partnerships, repeated student placements, and contextually rich learning experiences (Morris, 2019). When designing web-based systems to support academic-practice partnerships, a systematic approach should be taken that accounts for stakeholder input from preceptors and placement site staff. For public health partnerships specifically, designing systems that reduce the preceptor time commitment and workload, such as providing templates, building in repeatability for work assignments, integrating documentation about expectations, and allowing for cross-training among placement site staff can help to make APEs and the partnership in general function more efficiently. Incorporating recommendations from all stakeholders for the design of the supporting technology can ensure the highest level of system use and better meet the needs of the placement sites.

Importance of Documenting Practice-Based Experiential Learning

As students practice in clinical, community, and professional settings, resulting

documentation of the experiences can vary in form and purpose. While some documentation is purely administrative, such as agreements with sites and progress reports, other documents contribute to and demonstrate attainment of learning objectives, such as reflective papers and self-assessments (Greece et al., 2019; Hinch et al., 2020; Steigerwald et al., 2016). This section provides an overview of the purpose and benefits of documenting practice-based experiential learning and discusses practical concerns distinct to public health education.

Tracking and Documentation Purpose

A key component of tracking practice-based learning is capturing not only the integration of theory and practice, but also the transformative process of creating new knowledge and making meaning from experiences (Labissiere & Reynolds, 2004). Standard assessment tools are not necessarily sufficient for measuring these types of higher order developmental processes, which include reflective observation and abstract conceptualization, because they reflect student growth and can occur over an extended period of time. The purpose of practice-based documentation is to therefore capture the reflection on new experiences, connections made by the student as a result of the learning experience, and the generation of new, discipline-specific knowledge (Qualters, 2010).

Artifacts collected over the course of the practice experience can provide an assessment of individual student learning in context and over time (Lorenzo & Ittelson, 2005). Students may first enter a proposed work plan, take field notes, add progress reports, then synthesize all materials into a reflective paper or presentation. These culminating materials serve to provide connections between concrete learning experiences and learning objectives, as well as function as an alternative to exams for

formative and summative assessment (Powell et al., 2019; Qualters, 2010).

Critical and non-critical reflective activities are essential processes for students for meaning-making, conceptual understanding, and building a professional identity. They can also be documented via writing activities, blogging, online presentations, and multimedia artifacts such as videos and podcasts (Farrell, 2020; Fierke et al., 2019; Mann et al., 2009; Morris, 2019). When students review these types of artifacts collected over the course of the APE, it can provide another opportunity for reflection on development, achievement, or pivotal moments of learning (Yancey, 2019). In addition, these artifacts serve to reinforce conceptual learning when students create and reflect on their experiences (Akinde et al., 2017).

For preceptors and placement sites, APE documentation provides high-quality work products and deliverables for use by the organization, often at a low cost (Kovach et al., 2019). Artifacts can also document mentorship and professional networking activities with public health students and faculty (Hartwig et al., 2004; Wigington et al., 2017).

Tracking and documentation of experiential learning and practice experiences has a number of benefits for higher education institutions as well. It can provide a way for universities to show how they engage with the local community ("giving back"), that they offer innovative learning experiences, and that they are teaching "real world" skills (Hartwig et al., 2004; Roberts, 2018). An additional benefit of documenting APEs and partnership activities is that it serves to collect program assessment data. Systematic tracking allows institutions to track and evaluate curricular outcomes by examining practice experience data year over year (Hall et al., 2016; Steigerwald et al., 2016). Documentation of experiential learning is also often required for accreditation purposes.

Implications for Public Health

Public health is one of the disciplines required to document APEs as part of the accrediting process. To meet accreditation requirements, schools and programs of public health must provide documentation related to the competencies attained as a result of APEs, official requirements for students to complete APEs, and samples of practice materials from individual students for each concentration or degree (Bair et al., 2019; Council on Education for Public Health, 2016). There is flexibility on the specific artifacts, but nevertheless, they must demonstrate that students are attaining professional competencies through external practice experiences.

A professional competence is defined as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served" (Epstein & Hundert, 2002, p. 226). Public health students must attain at least five competencies, including three foundational public health competencies, as part of completing their practice experience. Foundational competencies are defined by the accreditation agency and sample artifacts used to demonstrate competency attainment can include presentations, work-based products, professional portfolios, or project deliverables (Carvalho et al., 2017; Council on Education for Public Health, 2016). For schools and programs of public health, systems to track and maintain these artifacts are thus critical to meeting these accreditation requirements.

Strategies for Tracking and Documenting Practice-based Experiential Learning

Despite the need for documentation across health science disciplines, particularly in public health, there is a lack of standardization in tracking systems and little agreement

on required characteristics and features. This section provides an overview of (a) the types of tools used for tracking experiential learning, (b) how others have tracked specific units of learning, and (c) the use of learning portfolios in higher education for tracking practice-based experiential learning.

Approaches and Tools

Prior to the 1990s, artifacts such as programmatic data, reflective activities, work products, and clinical data were primarily collected and stored in paper form (Farrell, 2020). The emergence of personal computers in the early 1990s provided methods for electronic storage and offered a number of advantages over paper-based methods, including the ability to compile artifacts in a more systematic way, support for more formats (e.g., multimedia), and a means of organizing and storing artifacts in searchable electronic databases (Barrett, 1994).

The rise of the Internet and hypertext further enhanced these systems by linking together materials, allowing remote access, and sharing (Barrett, 1998). As these systems became more sophisticated in the 21st century, both commercial and custom-developed web-based systems emerged for tracking practice-based experiences. Commercial solutions include platforms like Google sites, learning management systems such as Moodle, and vendor solutions aimed specifically at tracking experiential learning, such as TaskStream and Chalk & Wire (Lorenzo et al., 2005; McWhorter et al., 2013). Custom-developed solutions are also common and often developed from scratch or based on existing open source projects, such as Sakai or Mahara (Farrell, 2020). Besides competencies, these systems have been customized to support tracking of other units of learning in health science fields as well.

Digital badges have been used to document levels of attainment of specific learning/training tasks and as credentials. One advantage of badges is that they are generally transferrable outside of individual tracking systems (Abramovich, 2016). Badges can also add a level of gamification to pursuing learning outcomes (Gibson et al., 2015).

Entrustment professional activities (EPAs) are another unit of learning that are professional milestones that ensure students have the proper level of proficiency to complete specific tasks (ten Cate, 2013). They are like competencies but seek to define specific actions that demonstrate competency attainment in context. EPAs are primarily used in clinical health sciences where students must make medical decisions and perform complex procedures (Jarrett et al., 2022; Pittenger et al., 2016). By linking performance to competencies, entrustment professional activities are intended to allow hands-on practice in real world situations while also ensuring the safety of patients and decreasing the likelihood of costly mistakes.

Learning Portfolios and ePortfolios

Regardless of the specific approach or the unit of learning measured, virtually all paper-based and electronic tools for capturing and assessing practice-based experiential learning have some basis in the concept of a learning portfolio (Farrell, 2020). Paulson et al. (1991) offer a useful definition of the learning portfolio:

> A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection. (p. 60)

Two important elements as it relates to experiential learning are that reflection is integrated as a required component and that growth is measured over time. To adequately capture and document experiential learning, the self-reflection component is essential. In addition, whatever the type of learning tracked (i.e., competencies, entrustment professional activities, badges, etc.), student growth and milestones of learning must be documented.

As a broader concept, the learning portfolio can also be defined as a "coherent set of effective education practices that link reflective, integrative, and social pedagogy," (Kuh et al., 2018, p. 16). Systems to track and document these processes yield a collection of artifacts, reflections, and experiences to form a digital narrative of a student's learning over time (Habib & Wittek, 2007; Kuh et al., 2018). These features distinguish the learning portfolio from a simple showcase of student work or an extended professional resumé.

Learning portfolios emerged in paper-based form as a documentation tool in the 1970s and gradually evolved into ePortfolios as the personal computer and the Internet emerged over the course of 50 years (Farrell, 2020). ePortfolios provide an extension to traditional learning portfolios by offering a "digitized collection of artifacts, including demonstrations and accomplishments that represent an individual, group, community, organization, or institution" (Lorenzo & Ittelson, 2005). Online, web-based systems are now the predominant form of capturing experiential learning within higher education because of their flexibility and ability to accommodate these sorts of data. Because it is such a broad concept, while these systems may not necessarily be called "ePortfolios," experiential learning tracking requirements are closely aligned with ePortfolio

characteristics and thus ePortfolio elements permeate most types of tracking systems in use (Fallowfield et al., 2019; Farrell, 2020; Hinch et al., 2020; Nierenberg et al., 2007).

ePorfolios have been used extensively in a variety of disciplines, including public health education, chemical engineering, and dietetics and are well-suited to capture experiential learning processes (Bramley et al., 2020; Dawn et al., 2011; McWhorter et al., 2013; Stevens, 2013). Because there are no single, all-inclusive requirements for how ePortfolio systems should be designed and built, there is flexibility in what they collect and for what purpose. Within the health sciences, ePortfolio-based systems support collection of many types and formats of required practice-based data including reflective writing activities, clinical data and outcomes, field notes, project-based files, agreements, and multimedia formats (Akinde et al., 2017; Dawn et al., 2011; Hall et al., 2016; Nierenberg et al., 2007)

In addition to capturing the required artifacts related to learning, they are commonly used to track competency-attainment and accreditation artifacts, particularly for schools and programs of public health (Bair et al., 2019; Harver et al., 2019). Within the larger sphere of higher education, ePortfolios are widely used for a variety of purposes, with over 50% of all higher education institutions reporting the use of some type of ePortfolio system (Fallowfield et al., 2019).

Smith et al. (2014) describes the original purpose of MySPH, the current system under study, as a system that helps students, faculty, and preceptors manage practice collaborations and placements in support of meeting accreditation requirements. Although the term “ePortfolio” was not used to characterize the system, the purpose and goals track closely with learning portfolio and ePortfolio concepts. MySPH was designed

to collect a variety of accreditation artifacts over the entire APE process, including the signed practicum agreement, initial proposal, work products produced over the course of the APE, and the final reflective report. These artifacts provide both an opportunity for reflection and can be used to measure student growth and learning over time. Examining MySPH through the lens of ePortfolios could be beneficial when considering features, requirements, and recommendations.

Challenges and Barriers to Documenting Practice-Based Experiential Learning

Documenting and tracking practice-based experiential learning, using learning portfolios or otherwise, poses unique challenges. This section will outline barriers to documenting practice experiences that are specific to health sciences, as well as technical barriers that should be considered when evaluating the design of web-based APE and partnership tracking systems.

Challenges Within Health Science Education

Health science APEs are designed with defined roles for a student, preceptor, and faculty advisor. For the experience and related documentation to be meaningful, comprehensive, and relevant, all three individuals must be fully engaged in the process. Documenting proposed work, evaluating progress, and assessing on-going work can be time-consuming for all three stakeholder roles and poses challenges to each (Greece et al., 2019).

For students, capturing honest, authentic reflection is a challenge if learning outcomes are not well-defined (Fierke et al., 2019). Practice experiences can be unpredictable and unforeseen challenges may arise at placement sites. Students must have a clear understanding of what they are expected to learn and how they will be assessed in

order to guide their reflective activities and the creation of artifacts.

Preceptors and faculty advisors can be apprehensive about the type of materials that are to be collected for assessment purposes and how they will be used. As a guide for addressing these challenges when designing experiential learning assessment, Qualters (2010) recommends considering the four "essential questions" of why the assessment is taking place, what is to be assessed, how the assessment should happen, and how the results will be used. Preceptors especially may have concerns about documentation if the work is done at a site that involves vulnerable populations or communities. Ethical concerns must be considered when capturing work involving children and at sites that handle patient data (Neil et al., 2019; Wilson et al., 2018). To address this challenge, careful attention must be paid to what data is required for assessment and how it will be properly protected.

Cultural differences between academic institutions and placement sites can also hinder tracking and documentation efforts. Mismatched priorities, different organizational styles, and lack of clear communication about outcomes and deliverables can be a challenge for properly tracking activities and establishing trust (De Geest et al., 2013; Hartwig et al., 2004; Hays et al., 2019). If interest or engagement is low, there is a lack of trust, or learning expectations are not explicitly defined ahead of time, the breadth and depth of final project materials can suffer. In addition, lack of buy-in on behalf of students, preceptors, or faculty advisors when implementing tracking systems can make them ineffective and lead to incomplete documentation (Fallowfield et al., 2019).

Technical Barriers to Tracking and Documentation

Thoughtful planning and design of APEs that outline assessment criteria and

engage all stakeholders in determining what materials will be collected is important, but there are also technical concerns when developing tracking systems. A focus on system design, proper support, and deliberate planning of implementation are also needed to overcome challenges when documenting practice experiences and partnership activities.

Systems that are time-consuming to use, especially for working professionals, can pose a barrier to use (Dawn et al., 2011). Software must be simple to use, familiar, and appealing. To reduce the time burden required, software to track learning should be intuitive and, where possible, employ features that are common to mainstream, commercially available technology that users commonly encounter in their personal lives, such as Facebook, Google tools, and WhatsApp (Naveh & Shelef, 2021; Tofade et al., 2016).

Inadequate planning for implementation can also affect technology adoption and use among users (Nierenberg et al., 2007; Reynolds & Shaquid Pirie, 2016). It can take an extended amount of time to develop and launch a new system, which can ultimately affect stakeholder buy-in. Insufficient support for users can also hinder effectiveness of tracking systems and reduce use among students, preceptors, and faculty (McWhorter et al., 2013; Shepherd & Bolliger, 2011). Because software to track learning is often custom-developed and may not use a standard user interface, planning for the appropriate development time and on-going support are essential to ensure success.

Technology Acceptance and Use

When evaluating systems to track experiential learning and making recommendations for improvements, it is critical to ensure the system will be accepted and used by as many stakeholders as possible. A lack of buy-in and use can make the

system less effective and present challenges to collecting comprehensive documentation. This section will present the theoretical framework for identifying what stakeholders find challenging or valuable about the existing system, as well as factors that influence their use or intention to use the system. An overview of the Unified Theory of Acceptance and Use of Technology (UTAUT) will be presented, followed by other factors that interact with UTAUAT constructs, and conclude with a discussion of the application of UTAUT to existing systems that are relevant to the current study.

Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT was first proposed by Viswanath Venkatesh and others as an umbrella model to consolidate the Technology Acceptance Model (TAM) and seven other similar models that predict individual acceptance and intention to use technology (Venkatesh et al., 2003). By combining the previous models, it attempts to find the common factors and synthesize them into a single, unified view to measure user perceptions and attitudes toward a specific technology (Straub, 2009; Venkatesh et al., 2003; Venkatesh & Davis, 2000). While not discounting the previous models, UTAUT defines four constructs that influence an individual's behavioral intention (BI) and actual use of a specific technology: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) (Venkatesh et al., 2003).

While actual use of a system can be observed, BI is a proxy construct that predicts a person's future likelihood to use a specific technology based on self-prediction (e.g., "I expect that I would use this technology in the future") (Davis, 1989; Khan et al., 2021). BI has its basis in several models, including the Theory of Reasoned Action and TAM, and is influenced by attitudes, beliefs, perceived usefulness (PU), and perceived ease-of-

use (PEOU) (Park, 2009).

PE is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). PE is based on PU in the TAM model and is a measure of how much users feel that the technology will help them perform their job (Scherer et al., 2019). If a person believes that a system will help them in their work, they are more likely to use it. Previous research has found PE to be the strongest predictor of BI and actual use (Chao, 2019; Khechine et al., 2016).

Venkatesh (2003) defines EE as the "degree of ease associated with the use of a system" (p. 450) and it is closely related to PEOU in TAM. Systems that are perceived to be easier to use by users have higher BI and actual use. EE can be influenced by whether use is voluntary or mandatory and is especially important when introducing a new system. Over time, however, as users become more familiar and comfortable using a system and effort decreases, EE becomes less likely to be a significant factor (Ain et al., 2015; Khechine et al., 2020).

SI refers to the way a user believes others will perceive them as a result of using the technology and is significant in the mandatory, but not voluntary context (Venkatesh et al., 2003). If there is more social pressure to use a system from peers or superiors, especially if use is mandatory for school or professional work, BI and use increase (Ganotice & King, 2014).

FC is defined as the support and infrastructure that an organization provides in order to remove barriers to use (Venkatesh et al., 2003). The more a user believes they are well-supported in terms of training, technical support, and infrastructure, the more

likely they are to use the system (Garone et al., 2019). Higher FC can also influence EE by reducing the effort required to use the system.

The four moderators of gender, age, experience (with a new technology), and voluntariness of use (whether use of the system is mandatory or the individual could choose to use it) were proposed in the original UTAUT model (Venkatesh et al., 2003). Figure 2.1 summarizes the UTAUT model and the interaction between constructs and moderators.

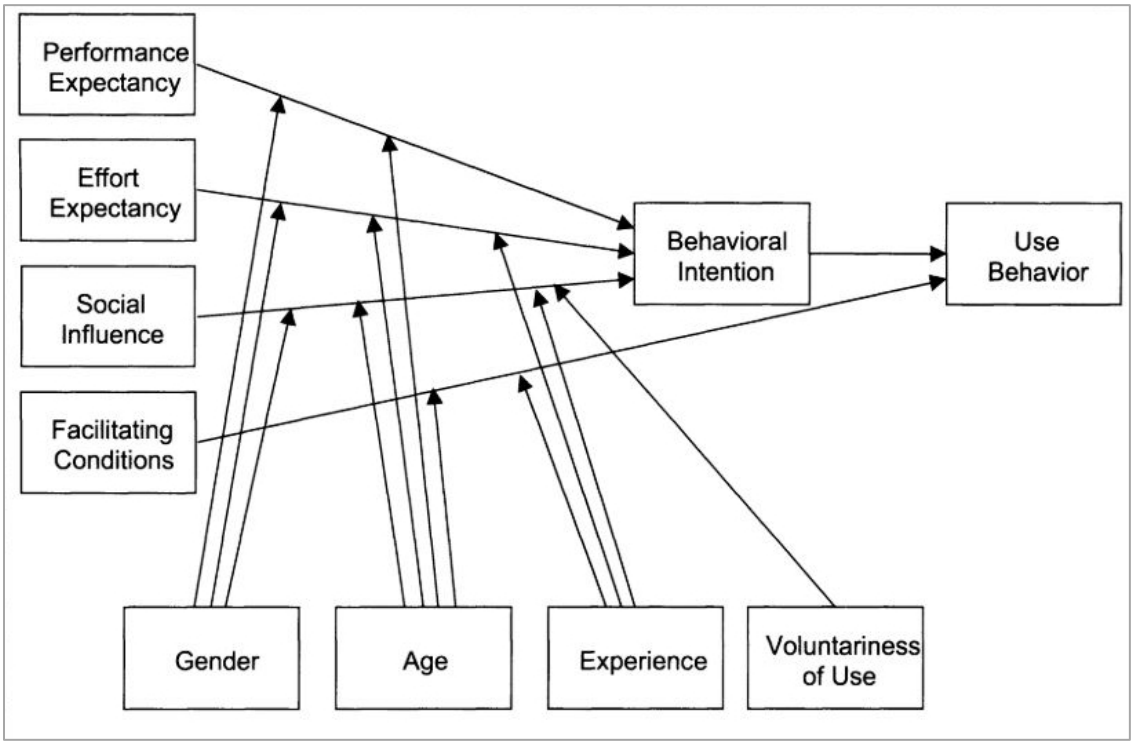

Figure 2.1 The Unified Theory of Acceptance and Use of Technology (UTAUT) Model

Reprinted from "User acceptance of information technology: Toward a unified view" by V. Venkatesh, M. Morris, G. Davis, and F. Davis, 2003, *MIS Quarterly*, *27*(3), p. 447. Reprinted with permission.

Those moderators have not been uniformly applied in subsequent studies and there have been calls to reconsider them to include other moderators such as attitude toward technology, self-efficacy, and personal innovativeness to better account for

individual user behavior (Dwivedi et al., 2019; Venkatesh et al., 2012). Nevertheless, the original moderators are still widely used and have proven to be useful when distinguishing between different types of users when evaluating systems using UTAUT (Chao, 2019; Khechine et al., 2016).

Other Factors Related to UTAUT

Higher levels of PE, EE, SI, and FC (as well as PU and PEOU) have all been shown to increase BI and actual use of technology. Constructs from other models and theories, however, have been shown to interact with those factors and can provide additional insight into technology acceptance and use.

Because of its overlap with other theoretical models, research using UTAUT constructs often draws on other models to examine additional factors that could interact and influence BI and use (Lee, 2010; Roca et al., 2006; Tao et al., 2009) Self-efficacy, which is part of Social Cognitive Theory and defined as a person's belief in their capabilities to exercise control over events in their lives, is one example that has been combined with UTAUT (Bandura, 1986). Self-efficacy has been shown to increase BI and use when evaluating web-based systems (Abdullah & Ward, 2016; Chao, 2019). Users who are more confident in using the system and feel more self-efficacy with technology perceive systems to be easier to use and have a higher BI.

Another approach that could be helpful in combination with UTAUT is to evaluate what users perceive to be burdens to using a specific system. Suh et al. (2016) found that computing systems that are difficult or burdensome to use in terms of mental, time, privacy, and financial burden have a negative effect on BI and technology adoption. Suh's User Burden Scale has previously been applied to evaluate technology systems

used in behavioral intervention research within the health sciences (Goldstein et al., 2020; Mata-Greve et al., 2021; Turner-McGrievy et al., 2021). Decreasing perceived user burden can increase BI and use. Examining not only the factors that increase the likelihood of technology use, but also those that discourage use could provide a fuller picture when evaluating and recommending changes to an existing web-based system.

Usability and User Experience

When examining factors related to technology acceptance and use, the usability of the system and user experience should also be considered. In its simplest form, usability testing is "evaluating a product or service by testing it with representative users" (*Usability Testing*, n.d.). The International Standards Organization (ISO) identifies three widely accepted dimensions of usability improvement: effectiveness, efficiency, and satisfaction (*ISO 9241-11:2018 - Ergonomics of Human-System Interaction — Part 11: Usability: Definitions and Concepts*, 2018). Effectiveness relates to the user's ability to complete their work using the system, efficiency is the resources required to perform tasks, and satisfaction is concerned with subjective reactions to the system by users (Vlachogianni & Tselios, 2022). A related concept that has been used in instructional design approaches to educational technology is human performance technology (HPT). Similar to usability's focus on increasing effectiveness and efficiency, the goal of HPT in learning environments is take a systematic and systemic approach in analyzing desired performance compared to actual performance, and to identify how performance and learning can be improved (Stefaniak, 2019).

There are a wide range of methods for conducting usability testing, including cognitive walkthroughs, interviews, prototype evaluation, focus groups, and software

analysis (Paz & Pow-Sang, 2016). Despite the varied approaches and methods, the goal of usability testing is to make the system more efficient and effective, increase user satisfaction, and to ensure the technology aligns with user needs.

User experience (UX) is often thought of as a component of usability, but Hassenzahl (2008) argues the two are separate, albeit related concepts:

> Consequently, I define UX as a momentary, primarily evaluative feeling (good-bad) while interacting with a product or service. By that, UX shifts attention from the product and materials (i.e., content, function, presentation, interaction) to humans and feelings – the subjective side of product use. In addition, it emphasizes the dynamic. UX becomes a temporal phenomenon, present-oriented and changing over time (pg. 12).

UX is thus more concerned with a user's emotional and psychological reactions to the system rather than how the system functions. A lack of focus on UX evaluation can cause negative emotional responses among users, including anxiety, irritation, and frustration (Brave & Nass, 2007; Suh et al., 2016). In addition, UX deficiencies can also decrease user satisfaction and perceived user competency, and lead to decreased engagement with the system (Asawa, 2009; Jones, 2010; Meishar-Tal & Levenberg, 2021). As it relates to technology acceptance and UTAUT, these negative emotional reactions can decrease BI and negatively influence PE, EE, and SI.

UTAUT Application Within Higher Education

Although UTAUT and TAM originated in the psychology and information sciences fields, they have both been used extensively to evaluate technology acceptance and use in education research (Khan et al., 2021; Lakhal et al., 2013; Oye et al., 2014;

Wedlock & Trahan, 2019). In health science education specifically, UTAUT has also proven to be an effective model to evaluate a wide range of technology systems, including medical students' use of an online learning system (Aziz et al., 2022), dental students intention to use teledentistry tools (Alabdullah et al., 2020), and pharmacy students' acceptance and use of a mobile-based application for lab safety training (Ameri et al., 2020). When designing health science systems that will be used by stakeholders in the community (outside of the higher education institution), UTAUT can be applied to ensure thoughtful design and to account for input from stakeholders who will approach the system differently depending on their role (Owens et al., 2019).

The few studies that have used the UTAUT or TAM model to evaluate ePortfolio systems have indicated that PU, PEOU, and self-efficacy are strong predictors of acceptance and use (Abdullah et al., 2016). Higher levels of PU and PEOU can also contribute to a more positive attitude toward the technology on behalf of users. A positive attitude has been shown to predict increased BI to use ePortfolios (Chen et al., 2012; Shroff et al., 2011).

Despite these findings, there is limited research on the application of UTAUT when evaluating learning portfolios used for APEs and for supporting academic-practice partnerships. Because of its wide use in higher education, as well as its applicability as a model to evaluate health science technology and learning portfolio acceptance and use, this study will use the UTAUT model as the basis for evaluating the existing practice experience documentation system. The related effect of user burden, specifically mental and privacy burdens, imposed by the system will also be examined to complement and build upon the UTAUT constructs.

Chapter Summary

This literature review provided background on experiential and practice-based learning, documentation requirements and approaches, challenges to using web-based documentation systems, and a theoretical framework for evaluating specific technology systems. To summarize, APEs are rooted in experiential learning theory and are an important component of health sciences education. Maintaining placement site partnerships, fully documenting experiences, and tracking artifacts are required to support experiential learning and are often used in the accreditation process, particularly in public health. A variety of tools and strategies (many of them informed by web-based learning portfolios) have been used to address these requirements.

There is little research, however, on a wholistic approach to make certain these systems address the needs of all stakeholders involved, particularly as it relates to preceptors and practitioners. This research seeks to fill that gap by proposing a method of evaluating a practice-based experiential learning system to make recommendations about specific approaches that will ensure comprehensive documentation, stakeholder acceptance and use, and the widest possible user buy-in.

CHAPTER 3

METHOD

The purpose of this descriptive action research was to evaluate the practice experience tracking system and make recommendations for improvements to document and report on applied practice experiences (APEs) and academic-practice partnership activities that satisfies accreditation criteria, uses up-to-date technology, and meets the needs of all stakeholders. The goal was to examine how stakeholders perceive the system, identify technical challenges, and inform recommendations for improvements to the current or replacement system.

Research Design

This descriptive action research study engaged faculty, staff, students, and public health preceptors to participate in a systematic evaluation of an existing electronic APE tracking system with a goal of creating consensus recommendations for a replacement system to better suit the needs of the school. A descriptive action research design provides the best approach in that it is widely used in educational settings and has goals that are well-aligned with the study (Duman, 2021). As Mertler (2019) summarizes, the purpose of descriptive research is to "describe and make interpretations about the current status of individuals, objects, settings, conditions or events" (p. 98). As is the case for this study, research questions in descriptive research often begin with "what," "how," "when," and "where" (Siedlecki, 2020).

In addition, action research seeks to provide practical solutions to specific problems of practice within the researcher's local context (Mertler, 2019). Doctoral educational research is often conducted by professionals who are working to solve a problem directly related to and within their practice (Kumar et al., 2022). Working within the local professional context facilitates active collaboration between researchers and participants and allows researchers to integrate both quantitative and qualitative methods.

The research design was a descriptive evaluation that used a convergent mixed methods approach. A convergent mixed methods approach is defined as a single-phase study design in which the researcher collects both quantitative and qualitative data simultaneously (Fetters et al., 2013). A quantitative survey was used to gather in-depth information from key stakeholders about their perceptions of the current APE tracking system. Semi-structured interviews were used to gather qualitative data to provide a more in-depth understanding and expand upon results collected in survey responses. One of the key advantages of this research design is that it allows the researcher to compare results from multiple sources to triangulate findings (Creswell, 2014). In addition, it provides a fuller picture of what participants perceive to be valuable features and/or limitations of the existing system and what specific recommendations they have for improvement.

Quantitative research, which relies on survey and experimental designs, focuses on isolating specific variables to measure how they interact and influence one another, and the researcher tries to remain as removed as possible so as not to bias results (Creswell, 2014). Qualitative research, on the other hand, encourages the researcher to interact much more directly with participants to analyze, reflect on, and build a complete picture of the phenomenon being studied (Tracy, 2019).

By drawing on both quantitative and qualitative methods, the research design is flexible and allows researchers to mix methods as necessary. Descriptive research also aligns with the epistemology of the pragmatic paradigm, which uses an inquiry-based approach, prioritizes applicability, and focuses on the "what" and "how" of research problems when constructing knowledge (Creswell, 2014; Y. S. Lincoln & Guba, 2011; Mackenzie & Knipe, 2006). A descriptive action research approach rooted in the pragmatic paradigm fits well when considering the specific example of evaluating all aspects of a web-based APE tracking system and making design recommendations to improve educational outcomes and practice.

Setting

The setting for this study was the Arnold School of Public Health (ASPH) at the University of South Carolina in Columbia, SC, which consists of six departments that offer undergraduate and graduate degrees. Total enrollment in the ASPH for the 2022 academic year was 2,345 undergraduate and 792 graduate students. Of those graduate students, 496 are enrolled in the Master of Public Health (MPH) program. Two undergraduate degree programs, exercise science and public health, require students to complete a practicum or capstone experience as part of degree requirements. All MPH graduate students in each of the six departments are also required to complete a practicum.

The school has an existing online system that tracks both undergraduate and graduate practicums with the following functionality: matching students with opportunities and preceptors; collecting artifacts related to the practicum, such as presentations, final papers, evaluations from students, preceptors, and faculty; and

organization and demographic information from preceptors. MPH students completing a practicum use a component in MySPH called APEX, which stands for *Applied Practice Experience*. Undergraduate practicums are tracked by a separate component called *Opportunity Manager*. Each practicum tracked in the online system is assigned a triad of a student, faculty advisor, and preceptor. Preceptors are public health practitioners at community partner organizations who supervise students at the APE site. Faculty and preceptors may oversee one or more students using the system each semester.

MPH students are required to complete a process within the system that results in a signed practicum agreement before they begin the APE. Because of the current limitations of the system, undergraduates have a slightly different workflow. They search for and apply for a practice opportunity, then receive an offer from the organization sponsoring the APE. The process is complete when a faculty advisor reviews the application and offer then gives approval for the student to begin the practicum. Because the student is not required to accept the offer, an offer status of *pending* or *accepted* can reflect a completed undergraduate practicum.

While APEX is only used to track MPH practicums, Opportunity Manager can also be used to track graduate assistantships, internships, volunteer opportunities, and other practice experiences in addition to undergraduate practicums. For those non-practicum experiences, students may work with an advisor, a preceptor, or both.

Participants

In a typical year, approximately 160 undergraduate-level practicums and 50 MPH-level practicums are completed within the ASPH and tracked in the online system. In addition to the practicums, an additional 30-50 other practice experiences are

completed by undergraduates and graduate students at all other levels as well. Because of the overlap in faculty advisors and preceptors among all practice experiences, approximately 30 faculty and 50 preceptors use the system each year.

For this study, purposeful sampling using a criterion strategy was used. This sampling method requires participants to meet defined inclusion criteria in order to participate in the study (Palinkas et al., 2015). Inclusion criteria for students were those who had used either or both of the two components of MySPH (i.e., Opportunity Manager or APEX) during the 2022-2023 academic year or those taking the practicum preparation course (EXSC 401). For faculty, it was those who had used either or both of the two MySPH components during the 2022-2023 academic year or those who managed APEs as part of their work. Inclusion criteria for preceptors were those who had previously supervised APE students from the school or those who faculty advisors identified as working closely with the school as partners. To generate an initial list of potential participants who had used the system during the academic year, login records for Opportunity Manager and APEX were reviewed to create a list of people who had logged in from August 18, 2022, until March 13, 2023.

To identify additional potential participants to complete the survey and take part in interviews, I asked the faculty advisor teaching EXSC 401 and the school's Director of Applied Practice for suggested students, preceptors, and other faculty who might be appropriate to also include. Survey completers were also asked if they would be willing to participate in an interview.

In addition, I created a browser pop-up that displayed after a user had logged into the MySPH site asking if they would be willing to take the survey. The response options were *Yes, No, I have already completed the survey,* and *Ask me later.* The pop-up ran from March 15, 2023, until the survey closed on April 24, 2023. Answering *yes* took participants to the survey, *no* and *I have already completed the survey* dismissed the pop-up and did not show it again and *ask me later* paused displaying the pop-up for two days.

Once the potential participant list was complete, duplicates were removed, and the survey was sent via email to 304 potential respondents on March 13, 2023. The pop-up was shown starting on March 15 to 110 MySPH users after they logged in, with 23 (20.9%) answering they would take the survey or already had, 61 (55.4%) saying they were not interested, and 26 (23.6%) with a final answer of *ask me later*. Based on all recruitment sources, 82 respondents completed the survey. Table 3.1 presents the demographic characteristics of the participants who completed the survey.

Table 3.1 Survey Respondent Demographics

Role	**Student *N (%)* (*n*=61)**	**Preceptor *N (%)* (*n*=8)**	**Faculty *N (%)* (*n*=13)**
Degree program		N/A	N/A
Undergraduate	49 (80)		
Master's program	12 (20)		
Primary department		N/A	
Athletic Training	0		0
Communications Sciences & Disorders	0		0
Environmental Health Sciences	0		0
Epidemiology and Biostatistics	3 (5)		1 (8)
Exercise Science	16 (26)		7 (54)
Health Promotion, Education, & Behavior	1 (2)		1 (8)
Health Services Policy & Management	5 (8)		0

Physical Therapy	0		0
Public Health	35 (57)		3 (23)
Other	1 (2)		1 (7)
Gender			
Male	6 (10)	1 (12.5)	3 (23)
Female	55 (90)	6 (75)	9 (69)
Prefer not to say	0	1 (12.5)	1 (8)
Age			
18-24 years old	56 (92)	0	1 (8)
25-34 years old	4 (6)	1 (12.5)	3 (23)
35-44 years old	1 (2)	3 (37.5)	2 (15)
45-54 years old	0	0	4 (31)
55-64 years old	0	3 (37.5)	2 (15)
65-74 years old	0	1 (12.5)	1 (8)
over 75 years old	0	0	0
Primary Component			
Opportunity Manager	39 (64)	8 (100)	9 (69)
APEX	15 (25)	0	3 (23)
I use them both equally	7 (11)	0	1 (8)

Interviews were conducted concurrently while the survey was still open with a total of eight participants. Participants represented each of the three roles (i.e., student, faculty, and preceptor) with a range of genders and ages. Six people identified Opportunity Manager as their primary component and two people identified APEX as the primary component used. Opportunity Manager had at least one representative from each of the three roles and APEX had at least one representative from the two roles. Since preceptors do not use APEX, no preceptors were interviewed about that component. Table 3.2 presents demographic characteristics of interview participants.

Table 3.2 Interview Participant Demographics

Pseudonym	Role	Gender	Age Range	Primary Component
Rebecca	Preceptor	Female	45-54	OM
Beth	Faculty	Female	45-54	OM
Elise	Faculty	Female	25-34	OM
Ben	Student	Male	18-24	OM
Taylor	Preceptor	Male	25-34	OM
Jake	Student	Male	18-24	OM
Emma	Student	Female	25-34	APEX
Greg	Faculty	Male	25-34	APEX

Evaluation

This mixed methods research seeks to describe the perceptions and experiences of students, faculty, and preceptors using the existing practice experience tracking system (i.e., MySPH). Because MySPH is currently in use, a descriptive action research approach was utilized, and thus participants were not exposed to a new intervention or innovation. The purpose of descriptive research is to describe and interpret a group, setting, event, or phenomenon (Mertler, 2021b). Employing a mixed methods descriptive research approach to examine the current state of the system is required to gain a full understanding of how study participants utilize the system and to inform recommendations for improvement. This section will provide an overview of the research approach, why it is necessary, and how each of the five phases of the study will support the research process.

The goals of evaluating technology systems are to determine if the system is meeting user needs, to assess how suitable the system is for performing tasks, and to compare the system to products with similar functionality (Kirakowski & Corbett, 1990). Evaluation can occur at any point in the lifecycle of the technology product and can be

formative or summative (Crowther et al., 2004). Formative evaluation occurs during the design and development phase and is an iterative process that seeks to ensure the system meets its defined objectives and requirements, and that product weaknesses are removed (Gediga et al., 1999). During the design and build phase, formative evaluation can be used to inform decisions about how a system should work before it goes into production. Prototyping, collecting qualitative feedback from users, and usability testing can all be used during formative evaluation. Summative evaluations examine the current or final design as it already exists to determine whether the system is performing satisfactorily with regard to guidelines, standards, and expectations (Gediga et al., 1999). Because the current study evaluated a system already in use, it is primarily a summative evaluation, however, findings could be included in a formative evaluation of a future system or when making recommended improvements.

This study used a convergent mixed methods design to provide a complete, systematic description and evaluation of how participants perceive and use MySPH. Convergent mixed methods allows researchers to collect both quantitative and qualitative data at the same time rather than sequentially (Fetters et al., 2013). It is a common approach in practitioner-led and doctoral education research and is well-suited when evaluating a system that is already in use by participants (Arslan-Ari et al., 2018). The convergent mixed methods approach supports the purpose of the study by informing recommendations and establishing a plan of action to improve technology integration and educational outcomes (Ivankova & Wingo, 2018).

While some MySPH users have anecdotally expressed dissatisfaction with the current system over the past 10 years, no defined process has been established to collect

and analyze data about stakeholder perceptions and use. Attempts have previously been made to make incremental technical improvements, but those efforts were neither research-driven nor comprehensive. To address this problem, the current mixed methods descriptive evaluation was necessary to examine how system users perceive and use MySPH for their work.

Before recommendations for improvement can be formed, an accurate and complete evaluation of how stakeholders perceive and use the current practice and experience tracking system must be undertaken. Descriptive action research provides a way to fully examine characteristics of an existing group, setting, event, or phenomenon for the purposes of answering questions about a current situation (Dulock, 1993). Within that framework, a convergent mixed methods approach to collect quantitative and qualitative data during overlapping phases provides a good fit for conducting a thorough, research-based evaluation of perceptions and to form recommendations for improvement.

Data Collection

Multiple data collection methods were used to answer the research questions proposed in this mixed methods descriptive action research study. Quantitative and qualitative methods used for this research were a survey and interviews with faculty, staff, students, and preceptors. Table 3.3 summarizes the alignment of data sources used to address each research question.

Table 3.3 Research Questions and Data Sources

Research Questions	Data Sources
RQ1: What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and preceptors?	• Survey • One-on-One Interview

RQ2: What challenges do students, faculty, and preceptors face when using the current web-based system?	• Survey • One-on-One Interview
RQ3: What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?	• Survey • One-on-One Interview

Institutional review board (IRB) approval for human subjects was obtained from the university prior to beginning data collection and the IRB decision letter is included in Appendix E.

Survey

A survey was distributed to a purposeful sample of approximately 304 participants representing each role in the system: faculty, student, and preceptor. The survey consisted of 42 questions and included the following sections: demographic questions, such as age range, gender, and primary role in the system; questions based on the UTAUT (Venkatesh et al., 2003); questions based on the UBS (Suh et al., 2016); and several free-text, open-ended questions to solicit additional feedback. The full instrument is included in Appendix B.

Constructs from the UTAUT framework include performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). PE is based on perceived usefulness and relates to the belief that the system will help users do their jobs better. EE is most closely related to perceived ease-of-use and concerns the level of effort required to use the system. SI captures how the expectations of others influences use of technology and is measured in terms of both peers and those how have power over users (e.g., supervisors or their professors). Finally, FC relates to user beliefs about being

well-supported in terms of training, support, and infrastructure in using the technology (Garone et al., 2019).

Mental burden (MB) is defined as the level of attention or concentration the system requires and privacy burden (PB) relates to the risk of the system revealing information that the user would prefer not to share (Suh et al., 2016). Suh et al. (2016) identified a number of other types of burden that users could experience, including physical, financial, and social burden. Because MySPH is unlikely to make users physically uncomfortable (i.e., physical burden), cost them a significant amount of money (i.e., financial burden), or disrupt their ability to sustain social relationships (i.e., social burden), those constructs were not considered. MB and PB are the two types of burden participants are most likely to experience using MySPH and were thus the focus of the current study.

The UTAUT and UBS instruments have both been previously validated and used extensively in a variety of fields to evaluate information technology systems (Goldstein et al., 2020; Lakhal et al., 2013; Mata-Greve et al., 2021; Wedlock & Trahan, 2019). Garon et al. (2019) tested the reliability of the UTAUT on 193 university teaching staff and found subscale construct reliability coefficients (α) ranging from .78 to .89. The reliability of the UBS was tested on 375 participants with a total of 750 responses (two per participant) and determined to have a high overall reliability coefficient of .88 (Suh et al., 2016). Each subscale construct had a reliability coefficient of .80 or higher, except for mental burden (MB), which had a reliability coefficient of .72 (Suh et al., 2016).

For questions based on the UTAUT instrument, a 5-point Likert scale was used that ranged from *Strongly Disagree* to *Strongly Agree*. Sample survey questions include

"I find the system useful for my work/schoolwork," I find the system easy to use," and "I have the resources necessary to use the system." Questions based on the UBS instrument all used a 5-point Likert scale that, depending on the question, ranged from *Never* to *All of the time* or *Not at all* to *Extremely*. Sample questions include "The system presents too much information at once," "I need assistance from another person to use the system," and "I am worried about what information gets shared by the system."

Four questions were used to measure each of the following constructs: PE, EE, attitude toward using technology, SI, FC, SE, and difficulty of use. Three questions were used to measure privacy burden (PB) and two questions were used to measure MB. A comparison of the survey questions to the original scale questions, as well a listing of constructs measured for each question, is included in Appendix C. The last five questions of the survey were open-ended questions that asked respondents directly about which features they liked or disliked, recommendations for general improvements, training and support improvements, and any other comments they had.

Interviews

To complement and inform the survey data, semi-structured interviews with participants were also used. Qualitative interviews are useful to a mixed methods design because they provide context for the quantitative data and allow researchers to gain insights that may be missed by a more structured survey (Tracy, 2019). The full interview protocol was 16 questions and is included in Appendix D.

Potential interview participants were identified by talking with practice experience staff, including the undergraduate advisors and the workforce development associate within the school. In addition, a question on the survey asked if participants

would be willing to take part in a follow-up interview. The sample was comprised of students, faculty and preceptors who had utilized either or both components in the last year, students enrolled in the practicum preparation course, and preceptors who had previously supervised students. Interviews for this study were conducted face-to-face and remotely via Microsoft Teams. Teams is a widely available web-based videoconferencing platform used at the university and at most partner sites.

Participant consent was obtained to record all interviews: audio recording was used for face-to-face and video recording was used for remote interviews. All interviews took approximately 30-45 minutes and were transcribed. Interview questions for this study were tailored slightly to each participant's role in the system and were based on the same UTAUT and UBS constructs as those used in the survey. Table 3.4 shows how interview questions are aligned with each RQ and construct.

Table 3.4 Research and Interview Question Alignment Table

Research Question	**Interview Questions**	**Construct**
RQ1: What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and partners?	1. When and why did you start using MySPH 2. Tell me about how you use the system in your current role as a [student, faculty advisor, staff, or preceptor]. 3. What do you like most about the system? 4. Are you required to use the system? If yes… a. By whom? b. Would you use the system if you were not required? 5. Which features do you use most often? a. How do you feel about those features that you use regularly? b. How have these features helped you with your job or schoolwork?	Perceived usefulness Perceived ease of use Effort expectancy Social influence Attitude toward using the technology Voluntariness

RQ2: What challenges do students, faculty, and preceptors face when using the current web-based system?	1. In thinking about the current system, which features do you find difficult to use? 2. How did you learn to use MySPH for the first time? 3. Tell me about a time when you found it difficult to use the MySPH system. a. When you encounter an issue, what do you do? b. How has the school provided support to you when you found issues, if any? 4. Overall, how comfortable are you using the system?	Facilitating conditions Self-efficacy Mental burden Difficulty of use Privacy
RQ3: What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?	1. What are other potential areas for improvement that would help make the system easier to use? a. Which ones are critical to your work as a [student, faculty, preceptor]? 2. What are ways that training could be changed or improved? 3. What are ways that on-going support could be changed or improved? 4. If you were designing a brand-new system, how would you want it to work? 5. What features do you wish the current system had that would help you in your work?	Performance expectancy Effort expectancy Perceived ease of use Perceived usefulness Facilitating conditions

Data Analysis

Quantitative and qualitative data analysis were used to triangulate data sets in this mixed methods research study. Quantitative data was analyzed using descriptive statistics and qualitative data was analyzed using inductive (or thematic) analysis. Table 3.5 summarizes the alignment of data sources and analysis methods to be used to address each research question.

Table 3.5 Research Questions, Data Sources, and Analysis Method

Research Questions	Data Sources	Analysis Method
RQ1: What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and partners?	• Survey • One-on-One Interview	• Descriptive Statistics • Inductive Analysis
RQ2: What challenges do students, faculty, and preceptors face when using the current web-based system?	• Survey • One-on-One Interview	• Descriptive Statistics • Inductive Analysis
RQ3: What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?	• Survey • One-on-One Interview	• Inductive Analysis

Quantitative Analysis

Quantitative analysis of survey data focused on several constructs from the UBS and UTAUT scales, including mental burden (MB) and privacy burden (PB) from the UBS (Suh et al., 2016), and performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) from the UTAUT framework (Wedlock & Trahan, 2019). All survey questions used a 5-point Likert scale, with scores ranging from 1-5 and lower scores indicating more positive perceptions and ratings. Higher scores indicated more negative reactions. Grouped questions on the survey were used to address and score each construct.

Descriptive statistics were used to analyze survey responses. Means and standard deviations were reported for construct scores overall and based on role (e.g., student, faculty, and preceptor) to categorize and summarize results (Adams et al., 2018). All quantitative analysis was performed using JASP software.

Qualitative Analysis

To analyze interview data, inductive qualitative analysis was used. Inductive, or thematic, analysis is a process that starts with raw qualitative data, such as interviews, that the researcher organizes first into codes, then consolidates into categories, and finally interprets into emergent themes (Creswell & Poth, 2016). Qualitative summary tables (Buss & Zambo, 2016), along with a narrative using rich, thick description are used to present themes and assertions as part of the research findings.

Interviews

All interview data collected for the study was recorded and transcribed. The transcripts were then imported into Delve, an online software program that uses computer-assisted qualitative data analysis to generate and organize codes (*Delve*, n.d.). Open coding was used to create codes. Open coding is a process where the researcher breaks down data analytically and groups concepts by similarities and differences (Corbin & Strauss, 1990). In addition, inductive analysis was used, where codes were continually reviewed and modified as necessary to best fit the data as transcripts are reviewed (Tracy, 2019). Once all interview data had been coded, codes were grouped into relevant categories. Connections among categories were then used to build themes that informed assertions and interpretations that are reported in the study findings.

Survey Open-ended Responses

The last five questions of the survey asked open-ended questions about the most and least valuable features, recommendations for making the system easier, improving on-going training and support, and any other comments participants had. The open-ended questions provided an opportunity for participants to comment directly on the questions,

constructs, and topics from the survey. Comments from these questions were used to triangulate survey and interview data and to corroborate themes that emerged in the qualitative data.

Procedures and Timeline

This descriptive action research project was completed in five phases: phase one: identify survey participants; phase two: survey data collection; phase three: identify interview participants; phase four: conduct interviews; and phase five: survey and interview data analysis. Some phases were conducted concurrently and overlapped. Each phase is described below.

Phase One: Identify Survey Participants

In phase one, I obtained permission from faculty advisors overseeing undergraduate and graduate practice experiences to review recent login activity on MySPH to begin to build a potential participant list. I also asked those faculty advisors for other potential students, faculty, and preceptors to add to the list who may not have logged in recently. Undergraduate exercise science students must take EXSC 401 in the fall semester before their practicum experience, which occurs in the spring semester. As part of course requirements, approximately 80 students log in to MySPH to practice applying for practicums and post their applications. Once the applications are submitted, preceptors at partner sites log in to the system, review the list of students, and contact those who have matching interests and/or skills for specific opportunities at each practice site. I asked the undergraduate advisor for permission to send the survey to the students who were currently enrolled in EXSC 401.

To reach additional graduate students, I contacted the Workforce Development Associate (WDA) in the school to ask for a list of students who had an in-progress or recently completed practicum. Because some students use the MySPH system for graduate assistantships and other practice experiences, I also asked the WDA for permission to reach out to those other students as well.

Potential faculty and preceptor respondents were identified by asking both the undergraduate and graduate practice experience staff which preceptors had recently supervised a practice experience and which faculty and preceptors were the most active users. Examining recent login data allowed me to create an initial list of potential participants, and reaching out to faculty advisors and practice experience staff allowed me to identify additional students, faculty, and preceptors to add to the lists.

Phase Two: Survey Data Collection

Study data was collected and stored using the Research Electronic Data Capture (REDCap) service hosted at Health Sciences South Carolina (Harris et al., 2009, 2019). Survey participants first saw the study consent form, which is included in Appendix A. If they consented to participate in the survey, they were taken to the full survey; if they declined, they were thanked for their time and no further data were collected. The survey was sent via email to a list of approximately 300 potential participants collected in phase one.

Phase Three: Identify Interview Participants

As surveys were being completed, I began the process of identifying interview participants. There was a question on the survey to ask if they would be willing to participate in an interview. Undergraduate advisors, the WDA, and other practice

experience staff were asked to participate and/or make recommendations for other potential faculty, staff, and preceptor participants in the interviews.

Phase Four: Conduct Interviews

Based on the list generated in phase three, potential participants were contacted and scheduled for an approximately 30-45 minute interview. Interview participants, including those who indicated on the survey their willingness to take part, were contacted and scheduled while survey data collection is on-going.

Interviews took place either remotely over Microsoft Teams or in-person based on the preference of the participant. Remote interviews were recorded by the video conferencing software. In-person interviews were recorded using Google Recorder. Both software programs support automated transcription, which was used to generate initial interview transcripts. In addition, detailed notes were taken to record non-verbal cues such as body language, mood, and affect of participants.

Phase Five: Survey and Interview Data Analysis

Once data collection was complete for the surveys and interviews, data analysis began. Survey data with the proper coding was downloaded from REDCap and formatted appropriately for the data analysis software. Descriptive statistics using JASP software were used to analyze survey responses.

Once all interviews were completed, audio (mp3 format) and video (mp4 format) recordings were transcribed using a service called Ubiqus to create verbatim transcripts. Transcripts were then loaded into Delve for coding and thematic analysis. Open coding and inductive analysis, where codes are continually reviewed and modified as necessary, were used when analyzing the interview data.

Timeline

Table 3.6 indicates the approximate time frame for each phase of data collection and analysis.

Table 3.6 Timeline of Procedures

Phase	Activity	Time Frame
Phase One: Identify Survey Participants	Coordinate with undergraduate and graduate staff to identify potential participants	1 week
	Examine login data to determine active users	
Phase Two: Survey Data Collection	Email study survey invitation to potential participants	3 weeks
	Participants consent to take part and complete the study survey	
	Send a reminder to non-respondents	
Phase Three: Identify Interview Participants	Coordinate with undergraduate and graduate staff to identify potential participants	2 weeks
	Identify survey participants who indicated interest in taking part in an interview	
Phase Four: Conduct Interviews	Contact and schedule interviews with participants	6 weeks
Phase Five: Survey and Interview Data Analysis	Statistical analysis of collected survey data	2 weeks
	Transcription of interviews	2 weeks
	Thematic analysis of interview data and free-text survey questions	8 weeks

Rigor and Trustworthiness

Mixed methods research requires rigor and trustworthiness for both quantitative and qualitative methods. For quantitative methods, validity and reliability are essential to establishing rigor and trustworthiness. Mertler (2019) summarizes validity as measuring

what was intended to be measured and reliability as providing a consistent measurement. For this research study, validated and reliable surveys were used to collect quantitative data, as discussed in the Data Collection section. There are a variety of methods used to establish rigor and trustworthiness in qualitative research, which often depend on the type of study and how data are collected. Qualitative methods to ensure rigor and trustworthiness include using thick, rich descriptions when presenting findings; member checking; peer review; and audit trails.

Thick, Rich Descriptions

One method to ensure qualitative rigor and trustworthiness is the use of thick, rich descriptions when interpreting and reporting research findings. Thick, rich descriptions provide a highly detailed presentation of setting, evidence, and interpretations that allow readers to assess how the findings might apply to their context (Merriam, 2009). When presenting interview data and findings from the study, thick, rich descriptions and relevant participant quotations are used to provide a detailed narrative and enable the reader to make comparisons to their own context.

Member Checking

Member checking was also used as a method for ensuring rigor and trustworthiness. When using member checking, researchers provide participants with preliminary qualitative themes and findings to determine if participants feel they were represented accurately (Creswell, 2014). Interview data and preliminary summaries were reviewed with participants to verify accuracy.

Peer Debriefing

Another method used to ensure qualitative rigor and trustworthiness is peer debriefing. Lincoln and Guba (1985) define peer debriefing as review sessions with a knowledgeable peer to explore "aspects of the inquiry that might otherwise remain implicit within the inquirer's mind" (p. 308). During the dissertation process, meetings were held with the dissertation chairperson to go over research progress, methods, emerging interpretations, and analysis procedures to ensure rigor throughout the process. This strategy enhances accuracy and adds validity to the methods and findings (Creswell, 2014).

Memos

Finally, memos were used as an audit trail throughout the process. Memo-writing involves capturing codes, categories, themes, reactions, and other insights in the moment to continually analyze qualitative data while the research is on-going (Charmaz, 2006). For this project, a research journal with memos and notes was kept to document decisions, ideas, emergent themes, and developing assertions. In addition, memos were entered into the journal to document the process of coding, categorizing, and interpreting interview transcripts. Memo-writing increases qualitative rigor and trustworthiness by providing a record of how a researcher ultimately arrived at conclusions presented in the findings of the completed study.

Plan for Sharing and Communicating Findings

Research findings will be shared with all involved stakeholders at the conclusion of the study. Because collected data will be used to inform the design of a new system, results will be shared with participants in the study, who will include graduate directors,

preceptors, students, and staff who use the current applied practice experience tracking system. Findings will also be shared with the Associate Dean of Operations and Accreditation as well as the Assistant Dean for Academic Affairs and Online Education within the School of Public Health, who are ultimately responsible for accreditation and overseeing experiential learning in the school.

Results will be shared via meetings with participants at the school and departmental level and will include formal presentations to each group. Preceptors and students will be invited to a presentation of results in the fall semester following the completion of the dissertation. For faculty, presentations will be scheduled with each department chair to present results at departmental faculty meetings. Meetings with graduate directors, deans, and other pertinent staff will also be used to share research findings.

In addition, results will be shared with my dissertation committee as part of the ongoing research and dissertation-writing process. To protect participant identities and confidentiality, collected data have been de-identified wherever possible, results are only presented in aggregate, pseudonyms are used for interview participants, and care has been taken to avoid participants being identified due to context and/or a small sample size.

CHAPTER 4

ANALYSIS AND FINDINGS

The purpose of this descriptive action research was to evaluate the practice experience tracking system and make recommendations for improvements to document and report on applied practice experiences (APEs) and academic-practice partnership activities that satisfies accreditation criteria, uses up-to-date technology, and meets the needs of all stakeholders. Quantitative and qualitative data collection was guided by three research questions:

1. What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and preceptors?
2. What challenges do students, faculty, and preceptors face when using the current web-based system?
3. What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?

This chapter will present quantitative and qualitative results and will be organized into three sections: (a) quantitative data analysis, (b) qualitative data analysis, and (c) findings and interpretations.

Quantitative Data Analysis

A survey was used to collect quantitative data based on 10 specific constructs. The survey was made up of questions drawn from the Unified Theory of Acceptance and

Use of Technology (UTAUT) instrument originally developed by Venkatesh and the User Burden Scale (UBS) created by Suh (Suh et al., 2016; Venkatesh et al., 2003). The following topics will be presented in this section: (a) the survey instrument and (b) descriptive statistics.

Survey Instrument

The survey consisted of a brief set of demographic questions, questions that assessed 10 constructs drawn from validated UTAUT and UBS instruments, and five open-ended text questions that asked about features and recommendations. Each construct was assessed by a grouped set of one to four questions on the survey. For questions based on the UTAUT instrument, a 5-point Likert scale was used that ranged from *Strongly Agree* (1) to *Strongly Disagree* (5). Questions from the UBS instrument were also scored on a 5-point Likert scale with ranges from *Never* (1) to *All of the time* (5) and *Not at all* (1) to *Extremely* (5) depending the question. For all questions on the survey, a value of 1 represented the most positive value and ranged to 5, which represented the most negative value.

All questions were required, and an *I don't know* option was also provided for all questions and scored as a zero. Although the original UTAUT instrument used a 7-point Likert scale (Venkatesh et al., 2003) still used by some researchers, others have since validated and used the 5-point scale chosen for this study (Dwivedi et al., 2019; Kerwagen et al., 2023; Khatun et al., 2017).

Performance expectancy (PE), effort expectancy (EE), attitude toward using technology (ATT), facilitating conditions (FC), social influence (SI), difficulty of use (DOU), and self-efficacy (SE) were assessed with four items each with scores ranging

from a 4 (*most positive*) to 20 (*most negative*). Privacy burden (PB) was assessed with three items with a score from 3 (*low PB*) to 15 (*high PB*). Mental burden (MB) was assessed with three items with a score from 2 (*low MB*) to 10 (*high MB*). Lastly, behavioral intention (BI) to use the system was assessed with one item with a score ranging from 1 (*high*) to 5 (*low*) intention to use the system. In instances where a participant completed questionnaires about both systems (n=8), a mean score for each item was calculated to obtain a total score for each construct.

Cronbach's alpha was used to measure reliability for each of the constructs and ranged from a low of α = .58 for FC to a high of α = .95 for EE. Cronbach's alpha is a measure of internal consistency among subscale questions, with values between .70 and .95 indicating acceptable reliability among questions measuring a specific construct (Tavakol & Dennick, 2011). All constructs fell within that range except for FC (α = .58) and SE (α = .69). Table 4.1 summarizes the number of questions, score ranges, Cronbach's alpha for each question.

Table 4.1 Construct Survey Questions, Score Ranges, and Cronbach's alpha

Construct	**# of Survey Questions**	**Score Range**	**Cronbach's α**
Performance Expectancy	4	4-20	.81
Effort Expectancy	4	4-20	.95
Attitude toward using technology	4	4-20	.90
Social Influence	4	4-20	.75
Self-Efficacy	4	4-20	.69
Difficulty of use	4	4-20	.90
Facilitating Conditions	4	4-20	.58
Mental Burden	2	2-10	.84
Privacy Burden	3	3-15	.82
Behavioral Intention to Use	1	1-5	N/A

In the case of FC, if the question that asked *the system is not compatible with other systems I use* was removed, Cronbach's alpha rose closer to acceptable at α = .68. Further, if the question that asks if *a specific person (or group) is available for assistance with system difficulties* is also removed, the measure for FC rises to α = .90. For SE, if the question *I could complete a task if there was no one around to tell me what to do as I go* was removed, reliability rises to α = .75. If using the survey instrument in the future, those questions should be considered for removal or modification to increase internal consistency for FC and SE.

Descriptive Statistics

The survey was conducted during March and April of 2023. Based on demographic questions, most survey respondents were female (90%), students represented the largest role (61%), and most participants used Opportunity Manager (64%), as opposed to 25% who used APEX. Because Opportunity Manager is used primarily by undergraduates, and the number of undergraduates in the school is much higher than graduate students, a higher percentage of respondents for that component is to be expected. In addition, preceptors only use Opportunity Manager, and not APEX, which would also contribute to higher levels of respondents for Opportunity Manager.

For all constructs, lower scores corresponded to more positive feelings. For example, a sample UTAUT question that measured PE was "using the system increases my productivity as a student, preceptor, or advisor," with choices of *strongly agree* (1) to *strongly disagree* (5). A sample UBS question with this same positive direction for lower scores was, "the system is hard to learn," with choices of *not at all* (1) to *extremely* (5). All survey questions had the same positive and negative directions in terms of scoring

regardless of from which scale the question was drawn. Table 4.2 provides an overall summary of means, standard deviations, minimum score, and maximum score by construct.

Table 4.2 Construct Means and Standard Deviations

Construct	Mean	SD	Minimum Score	Maximum Score
Performance Expectancy	8.02	2.91	4	20
Effort Expectancy	7.74	3.63	4	20
Attitude toward using technology	8.97	3.86	4	20
Social Influence	7.15	3.19	4	20
Difficulty of use	7.22	3.86	4	20
Facilitating Conditions	7.82	3.17	4	20
Self-Efficacy	8.10	2.96	4	20
Mental Burden	3.52	1.99	2	10
Privacy Burden	4.04	2.20	3	15
Behavioral Intention to Use	1.82	1.09	1	5

Students generally felt more positively about the system than preceptors and faculty, but faculty had more positive scores related to BI, DOU, and MB. Compared to the other roles, preceptors felt most positively about PB imposed by the system, and they scored the highest (corresponding to more negative feelings) in PE, EE, ATT, FC, DOU, and MB. Table 4.3 provides a breakdown of means and standard deviations based on role.

Table 4.3 Construct Means and Standard Deviations by Role

Construct	Role		
	Student *M (SD)* (n=61)	Preceptor *M (SD)* (n=8)	Faculty *M (SD)* (n=13)
Performance Expectancy (PE)	7.84 (2.70)	9.00 (3.59)	8.27 (3.52)
Effort Expectancy (EE)	7.08 (3.05)	10.50 (5.53)	9.12 (3.91)
Attitude toward using technology (ATT)	8.60 (3.52)	11.38 (4.78)	9.23 (4.53)
Social Influence (SI)	7.05 (3.17)	7.13 (4.26)	7.65 (2.73)
Self-Efficacy (SE)	7.92 (2.93)	8.00 (1.93)	9.04 (3.60)

Difficulty of use (DOU)	6.95 (3.31)	9.88 (6.64)	6.85 (3.83)
Facilitating Conditions (FC)	7.51 (3.01)	8.88 (2.30)	8.65 (4.16)
Mental Burden (MB)	3.56 (1.90)	3.63 (1.85)	3.31 (2.56)
Privacy Burden (PB)	4.39 (2.26)	2.88 (0.64)	3.15 (2.12)
Behavioral Intention to Use (BI)	1.88 (1.19)	1.75 (0.46)	1.58 (0.86)

Qualitative Data Analysis

This descriptive action research study collected qualitative data using a series of semi-structured interviews with participants who had used a component of the MySPH system in the previous year. Seven semi-structured interviews were conducted with eight participants in a variety of roles (i.e., student, faculty, and preceptor). This section will provide an overview of (a) qualitative data collection, (b) coding methods and analysis, and (c) interpretations and findings.

Qualitative Data Collection

Interviews were conducted over approximately six weeks in the spring of 2023. Five of the interviews were conducted remotely over a Microsoft Teams meeting and two of the interviews were conducted face-to-face and recorded with the Recorder audio recording application. All interviews except one were conducted one-on-one; two undergraduate faculty advisors (Beth and Elise) requested that they be interviewed together.

Once all interviews were completed, audio (mp3 format) and video (mp4 format) recordings were transcribed using a service called Ubiqus. Ubiqus offers two types of transcription services: artificial intelligence (AI) transcription and traditional transcription done by a human. After initial testing with the AI service, human transcription was used because it proved superior both in accuracy and identification of speakers. Once all

interviews were transcribed, each transcript was reviewed for accuracy and participants were assigned pseudonyms.

Coding Methods and Analysis

Inductive qualitative analysis is an iterative, exploratory process that starts with a large amount of raw qualitative data, such as interview transcripts, that the researcher examines for patterns to form codes, which are consolidated into categories, and then eventually grouped into themes (Mertler, 2021b). Codes form the fundamental building blocks of inductive analysis and are defined as "a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (Saldaña, 2021, p. 5). Coding is an active process where the researcher assigns codes to sentences, phrases, words, or other segments of text to identify concepts, beliefs, actions, themes, cultural practices or relationships (Tracy, 2019).

Coding takes place over multiple cycles, which allows the researcher time to reflect, refine codes, identify patterns in the data, and form ideas about what is occurring and the underlying reasons. This iterative, cyclical process allows the researcher to gain new perspectives on the data and to create an "emerging map of what is happening and why" (Miles et al., 2018, p. 86). An important component of inductive analysis is that codes, categories, and themes emerge from the data, as opposed to deductive analysis, where pre-defined codes or ideas are applied to the data for categorization and analysis (Creswell, 2014). The next section will provide an overview of my coding and analysis process over three cycles, which each contained multiple rounds. I have provided screenshots, tables, and a detailed description of my inductive analysis process to provide

transparency about how I arrived at my interpretations of the qualitative data and as a method to ensure rigor and trustworthiness (Y. Lincoln & Guba, 1985).

Cycle 1 Coding

The purpose of cycle 1 coding is for the researcher to familiarize themselves with the data, create a coding structure, and begin to identify emerging patterns within the data (Tracy, 2019). Cycle one consisted of four rounds of coding and analysis. Initial codes, analytic memos and notes were generated in the first round. The second round consisted of coding the data again and adding, removing, revising, and re-organizing codes as necessary. Round three involved additional review and consolidation of codes and round four consisted of organizing all codes into five different classification types. In each of the four rounds, inductive analysis was used, where codes were continuously reviewed and slightly modified, or new codes were created, to better fit the interview data (Tracy, 2019). To begin cycle 1 coding, all transcripts were loaded into the Delve online qualitative analysis program.

Cycle 1 Coding Round 1. At the outset of the first round of cycle 1 coding, a portion of one transcript was coded and submitted for review by my faculty advisor. After review and discussion, a portion of a second transcript (from a different interview) was coded based on feedback and again shared for review with my faculty advisor. There was a second review and peer debriefing session to discuss codes and strategies, then all eight transcripts were coded using eclectic coding. Eclectic coding uses multiple first-cycle coding methods to create an initial first impression of the data, and it is well-suited to virtually all types of qualitative studies (Saldaña, 2021). The transcript portions that were initially coded to start round one were re-coded with the other transcripts.

In the first round, I used the open coding technique (also referred to as "initial coding") to begin searching for initial patterns in the data (Saldaña, 2021). Open coding is a process for identifying first patterns, thoughts, codes, and ideas during a close reading of all qualitative data (Charmaz, 2006). Transcripts were analyzed line-by-line, with codes assigned to words, phrases, sentences, and longer blocks of text. In addition, analytic memos were used to record reflections, thoughts, ideas, and notes during the coding process. Figure 4.1 shows the Delve interface and illustrates how codes were assigned to text passages.

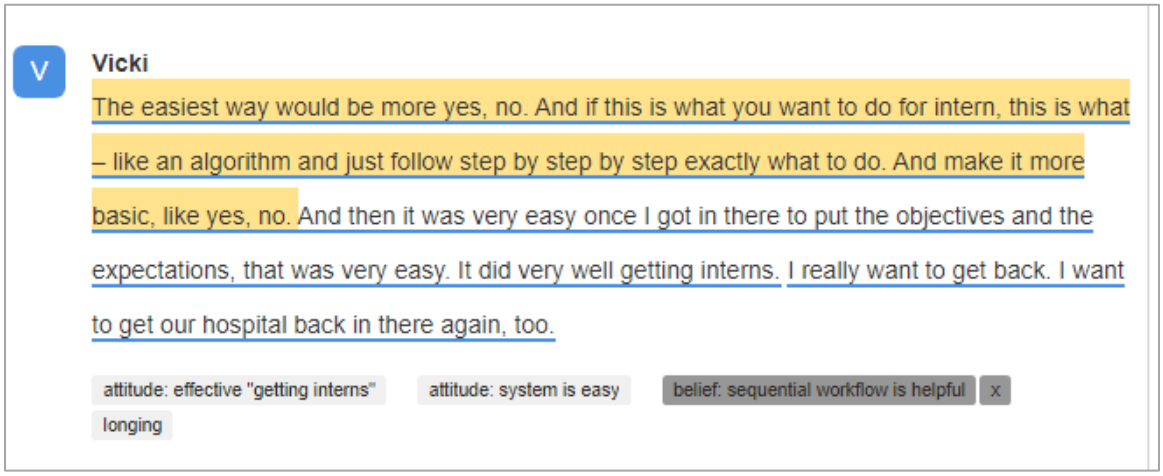

Figure 4.1 Delve Interface for Coding Text Passages

As coding took place in Delve, the audio and video recordings were used when there was a question about participant affect, emotion, meaning, or if anything in the transcript was unclear. Minor corrections were also made to the transcripts in Delve as necessary when inaccuracies or typographical errors were found. The initial codes formed the basis for subsequent cycle 1 rounds that refined, consolidated, and expanded the list of codes. At the completion of the first round of cycle 1 coding, there were a total of 174 codes identified.

Cycle 1 Coding Round 2. Before beginning the second round of cycle 1, I exported all codes from Delve to an Excel spreadsheet, then sorted by the number of times each code was used. Figure 4.2 shows the top codes by number of occurrences after the first round.

Code Name	Number of Snippets
confusion about how system works	22
suggestions for improvement in design	19
qualifying statement	19
purpose of using system	19
simplicity of system	18
value of system	15
ease-of-use	15
mandatoriness	13
frustration with system	12
suggestions for improvement in training	11
usefulness of the system	11
satisfaction with system functionality	11
monitoring	9

Figure 4.2 Top-ranking Codes Sorted by Number of Occurrences After the First Round of Cycle 1

To begin the second round of cycle 1, I reviewed each code and all coded text passages, with a particular focus on codes that occurred at a high frequency. High frequency codes were reviewed to see if they could be split into more specific ideas. All codes and passages were reviewed to see if there were in vivo codes missed during the initial round, if participants were expressing specific emotions or values, or if participants were describing a process. In vivo codes use the exact language of participants in the data record as the code (Miles et al., 2018).

Many of the codes identified in the first round were descriptive, which identify and catalog topics in the qualitative data (Saldaña, 2021). I discussed the codes with my advisor in a peer-debriefing session over Microsoft Teams meeting and via email, and he advised that too many descriptive codes can be problematic because they tend to

summarize and make it difficult to see the story in the data. As Saldana notes, descriptive codes are useful for topic indexing, but other types of codes are better at revealing "what may be going through a participant's mind" (Saldaña, 2021, p. 96). Therefore, in the second round, codes and text passages were examined more closely for context, intent, and meaning, which resulted in many more in vivo codes, as well as those related to emotions, values, and processes. In addition, many of the passages in round one used simultaneous codes, where a single qualitative datum (word, phrase, or sentence) is assigned multiple codes (Saldaña, 2021). During round two, I revisited all passages that used simultaneous codes to see if I could be more specific and precise about the meaning of the passage by assigning it a single code, dividing it into multiple passages each with its own code, or rewording any of the multiple codes to better capture the passage's meaning. At the end of round two, there were 229 total codes.

Cycle 1 Coding Round 3. In the third round, I reviewed all transcripts to determine if codes should be added, removed, consolidated, or reorganized. Some codes had similar meanings and could be combined, while other codes were applied to passages with slightly different meanings, which meant the passages needed to be re-coded. Codes that occurred at a low frequency were examined to see if they were necessary, or if their meaning was captured by other codes. The remaining simultaneous codes were also removed in round three. Throughout the process, I created analytic memos to record my thought process and keep a record of how codes evolved over time.

Round three also included a review of transcripts to see if participants repeating themselves contributed to certain codes having higher frequencies. There were a number of instances where participants repeated themselves, but they were not doing it for

emphasis or to represent strong feelings or emotions. For example, the phrase “like I said” appeared 24 times across the eight transcripts. Passages with that phrase and similar ones were re-examined to see if codes were repeated unnecessarily. At the end of round three, there were a total of 177 codes.

Cycle 1 Coding Round 4. In the fourth round, codes and transcripts were re-examined to consolidate, expand, and re-code as necessary. Codes were also reduced from six classification types down to five distinct types: in vivo, process, emotion, values, and descriptive. Saldaña cautions against using too many different types of first cycle coding methods, which guided the decision to re-examine all codes and determine if they could be converted to an existing coding type to better fit the data and tell a more meaningful story (Saldaña, 2021). Once the review was complete, codes were downloaded from Delve to a spreadsheet and color coded based on their type. Figure 4.3 shows a screenshot of sample codes in the spreadsheet labeled by type and color-coded.

belief: personalize site based on interest	3	values
faculty providing training	3	process
unpredictability of practicum process	3	descriptive
connecting partners and students	3	process
assuming a different role in the system	3	process
confusion about process requirements	3	emotion
attitude: system accomplishes job	3	values
awareness of support resources	3	descriptive
trial and error	3	invivo

Figure 4.3 Screenshot of Sample Codes at the End of Third Round Labeled by Type

At the end of the fourth round, there were a total of 156 code types. Table 4.4 lists the total number of codes over each round and the and the number of each classification type after the fourth round.

Table 4.4 Cycle 1 Codes Listed by Round and Type

(Note: Number in parenthesis indicate number of codes)

Round 1-3 Code Totals	Round 4 Code Type Totals
Round 1 (174) Round 2 (229) Round 3 (177)	In Vivo (11) Emotion (33) Values (57) Process (33) Descriptive (22) Total (156)

Cycle 2 Coding

The purpose of cycle 2 coding was to begin looking for patterns and relationships among the codes. The goal is to develop "a sense of categorical, thematic, conceptual and/or theoretical organization from [the] array of first cycle codes" (Saldaña, 2021, p. 297). To begin cycle 2, I first printed a complete list of codes onto individual slips of paper so that I could manipulate the codes and physically sort them into categories. Figure 4.4 shows my codes sorted into categories at the end of a tabletop sorting exercise.

Figure 4.4 Codes Sorted into Categories Using Paper and Post-It Notes

Saldaña refers to this manual approach as a "tabletop" exercise, and it enables the researcher to shift around the codes repeatedly to form different interpretations, stories, and categories for the data (Saldaña, 2021; Tracy, 2019).

Cycle 2 consisted of three rounds of grouping codes and building patterns. Notes and analytic memos were taken to document the thought process in creating categories in each of the three rounds. I sorted the codes into categories three different ways on a tabletop over the course of three days. I did this over three days because I wanted to bring a fresh perspective to the codes each time I performed the sorting exercise and allow time for reflection about new ways the codes might fit together.

Cycle 2 Coding Round 1. To begin cycle 2, I laid all the codes out on a large table and began looking for ways they might be related and grouped together. I used five broad categories during the first round so that I could get a feel for the data and begin organizing. The resulting categories were *process of using the system*, *response to using the system*, *general beliefs*, *beliefs and values specific to MySPH*, and *feelings about the system*. The categories covered how people use the system, their emotional responses, general beliefs about how technology should work, beliefs about how the system specifically should work, and their perceptions of the system. The response to using the system and feelings about the system categories both included positive and negative reactions to the system. As I refined the categories and groupings, I kept handwritten notes to track my thought process. Figure 4.5 shows a sample page of handwritten notes from my research journal taken during the first round of cycle 2.

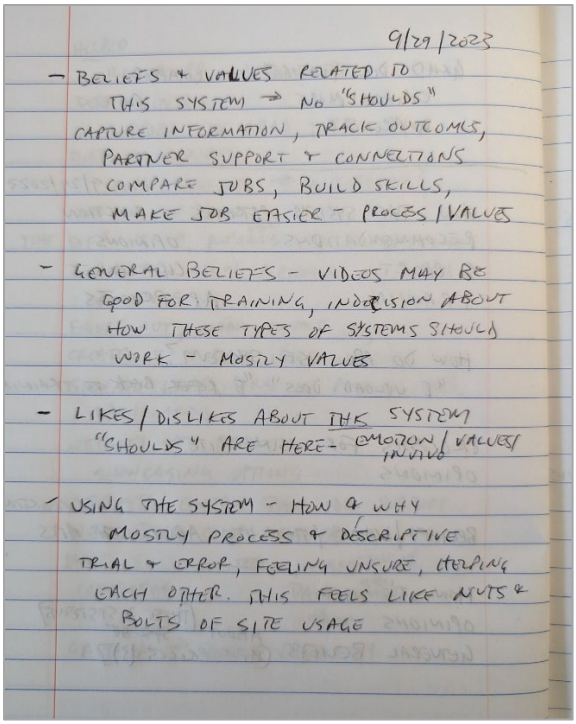

Figure 4.5 Sample Handwritten Notes Taken
During First Round of Cycle 2

Cycle 2 Coding Round 2. In the second round of cycle 2, I looked more specifically at the topic to which the code referred and if there were relationships among those. This approach sought to examine how the codes represented the various components of both the website and the process, and included codes such as training, support, practice experience process, and system use. I wanted to examine, for example, if there would be codes representing more positive emotions and responses in the training category and more negative representations in the support category. Or perhaps there was a story to tell about how participants felt about the overall practice experience process that would become apparent by grouping codes into that category. Organizing more specifically around topic area gave me a better understanding about participant perceptions of individual components and processes. This approach in the second round resulted in a total of seven categories for the codes: *training*, *attitudes/values/motivations*,

practice experience process, *beliefs about technology in general*, *support*, *general reactions to technology*, and *system*.

Cycle 2 Coding Round 3. Round three of cycle 2 represented a significant expansion in the number of codes and included modified versions of categories uncovered in the first and second rounds. Broadly categorizing the data in the first two rounds allowed me to see patterns in the data, but I felt there was a need for more nuance and specificity for my categories.

For example, the category of *support* from the second round was further broken down into *perceptions about support for this system* and *performing support*. Participants had emotional reactions and beliefs about how support was provided for the system, which resulted in the *perceptions about support for this system* category. They also talked about support as a process – e.g., faculty providing support and the process for requesting support. In addition, some codes from the second-round *support* category also were recategorized in round three to the *recommendations* and *general technology beliefs* categories. Participants made recommendations about how support should be provided for MySPH, and how they believed technical support should be provided in general (not specifically talking about MySPH).

The *training* category offers another example of expansion and reorganization. Participants talked about how they first encountered the system, how they began using it, what training (if any) they had, and who helped them to get started. Those processes, emotional reactions, and attitudes were regrouped into a category called *starting* that included codes related to starting to use the system. As with the *support* category, some *training* codes also moved to the *recommendations* and *general technology beliefs*

categories if participants had specific recommendations or expressed beliefs about how training should be provided in general.

There was ultimately a total of 16 categories identified at the end of the third round. Table 4.5 shows the final list of third round categories, with the aggregate number of code occurrences in each category across all interview transcripts.

Table 4.5 Category Listing and Number of Code Occurrences in Text Passages

Category	**Total Occurrences**
Descriptions (summaries) of system	27
Features	24
Perceptions about the system	43
Recommendations	29
Concern	2
Emotional reactions	16
General technology beliefs	30
Predictability	29
Beliefs about practice experiences	6
Job-seeking	15
This system and the APE process	54
Uptake and motivation	49
Performing support	53
Perceptions about support for this system	28
Finding and navigating	8
Starting	32
Total	445

Cycle 3 Coding

During cycle 3, themes and assertions were developed based on the categories created in cycle 2. A theme is defined as an attribute, descriptor, element, or concept that organizes a group of repeating ideas expressed by participants to create overarching meaning (Vaismoradi et al., 2016). Assertions are reflective statements that attempt to

represent, summarize, and interpret participant perspectives on each theme (Creswell, 2014; Nolen & Talbert, 2011).

Cycle 3 consisted of three rounds. In the first, I created themes from cycle 2 categories. In the second, I re-examined the themes to see if they needed to be adjusted or changed, and I created initial assertions. In the third round, I revised my assertions after reviewing the codes and text passages for accuracy and to ensure assertions matched what participants actually said.

Cycle 3 Coding Round 1. At the outset of the first round, I created categories in Delve and organized all the codes to reflect the results of my cycle 2 tabletop sorting. The process I used to establish themes was to add the categories to Delve, drag all existing codes into the categories, then export the categories and codes to an Excel spreadsheet. Figure 4.6 shows a screenshot of two sample categories in Delve, along with an analytic memo describing my interpretation of the *job-seeking* category.

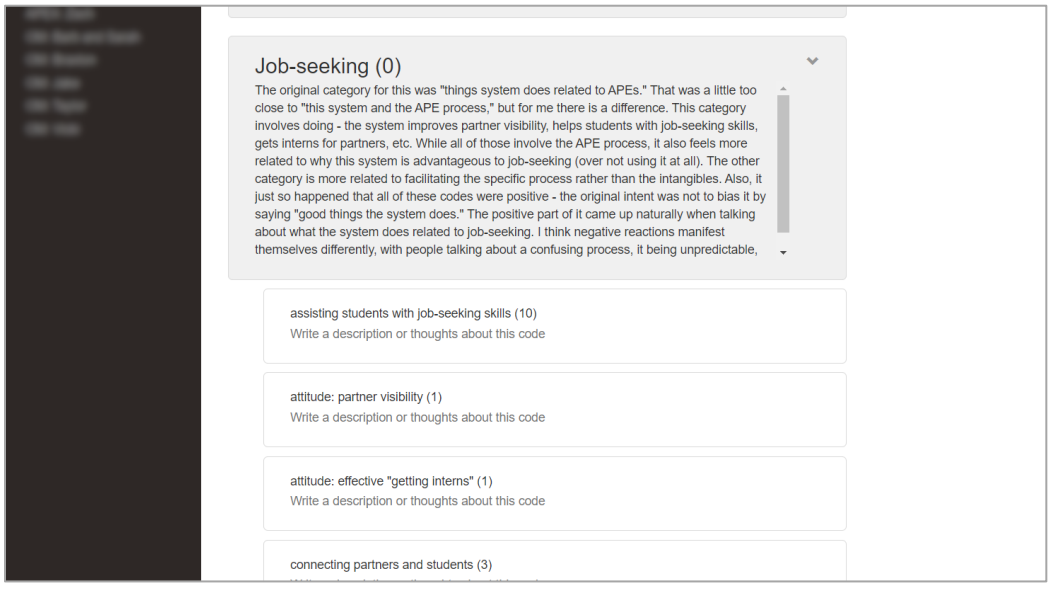

Figure 4.6 Categories with Codes and Sample Analytic Memo Describing the Job-Seeking Category

The resulting spreadsheet allowed me to see patterns and relationships by sorting and filtering the categories in different ways, examining frequency counts, and generally seeing the bigger picture of the data. At the conclusion of the first round, five themes emerged: *emotional responses*, *attributes of the system*, *beliefs and values*, *perceptions*, and *processes*.

Cycle 3 Coding Round 2. To begin the second round, I mixed up the 15 cycle 2 categories arbitrarily (by sorting them alphabetically) to search for alternative themes. Refinement of themes is an important step in the inductive analysis process and involves identifying candidate themes that may not actually be themes, collapsing and separating candidate themes, and ensuring that there are clear distinctions in meaning between themes (Braun & Clarke, 2006). In addition, as Saldaña (2021) notes, themes are not merely short categories or labels; rather, they expand on "the major ideas through the use of an extended phrase or sentence" (p. 260).

The themes initially developed in the first round felt more categorical and less like they were expanding on major ideas. While second-round themes had some basis in the first round, categories were grouped differently, and I reflected on what ideas participants were expressing. For example, I felt that *attributes of the system* and *processes* were too broad and did not necessarily tell a story about the data. Categories from those two themes were re-organized to better represent the ideas participants were expressing. They were moved to *how the system operates* and *supporting the process* (along with other re-assigned categories for each of those themes) respectively.

Four major themes with corresponding assertions emerged from the data in the second round of cycle 3: 1) how the system operates, 2) reacting to technology, 3)

supporting the process, and 4) training and support. The total number of codes in each category, category names, and resulting themes are summarized in Table 4.6.

Table 4.6 Themes, Categories, and Code Count for Each Theme

Theme	Categories	Code Occurrence Count
How the system operates	• Descriptions (summaries) of system • Features • Perceptions about the system • Recommendations	123
Reacting to technology	• Concern • Emotional reactions • General technology beliefs • Predictability	77
Supporting the process	• Job-seeking • This system and the APE process • Uptake and motivation	124
Training and support	• Performing support • Perceptions about support for this system • Finding and navigating • Starting	121

Cycle 3 Coding Round 3. Round three started with a peer debriefing session via email with my faculty advisor. He recommended reviewing the themes once more and revising the assertions for each theme to be more specific and focused. Introspection and continually stepping back to re-examine categories, interpretations, and the data are an important component of verifying that findings are accurate and meaningful (Braun & Clarke, 2006; Mertler, 2019). During round three, I revisited my codes, analytic memos,

notes, and the interview transcripts themselves to consider if my themes and assertions were appropriate.

While themes from round two did not change, during round three I revised my assertions to better reflect and support the data. A summary of final themes and assertions is provided in Table 4.7 below. Findings and interpretations based on the three coding cycles will be presented in the next section.

Table 4.7 Final Themes and Corresponding Assertions

Theme	Assertion
How the system operates	Participants express positive perceptions toward the current MySPH system but indicate specific features and functionality could be improved to better meet the needs of system users.
Reacting to technology	Participants experience negative emotions and reactions when technology is not designed to function in clear and predictable ways that align with their expectations and beliefs.
Supporting the process	Participants identified two key components when designing a system to accommodate an often unpredictable APE process: uptake of the system by as many stakeholders as possible, and technology that is designed to be flexible and adaptable.
Training and support	Participants express positive perceptions about learning to use the system and on-going support, but experience frustration with ease-of-navigation and knowing where to go on the MySPH site.

Findings and Interpretations

Once inductive qualitative data analysis was complete, four major themes emerged. The following section will present findings and interpretations of each of these themes: (a) supporting the process, (b) reacting to technology, (c) training and support, and (d) how the system operates. In the following sections, interview responses are

labeled by role, with students as (s), faculty as (f), and preceptors as (p) after each pseudonym.

Theme 1: Supporting the Process

Participants identified two key components when designing a system to accommodate an often unpredictable APE process: technology that is designed to be flexible and adaptable, and uptake of the system by as many stakeholders as possible. Theme 1 relates to the way that participants perceived MySPH in relation to the APE process. Participants described their beliefs about the APE process, positive and negative perceptions of how the design of MySPH functions related to the process, and their motivations for and beliefs about using the system.

Participants value MySPH's features that expose students to multiple careers, build job-seeking skills, and capture information related to the practicum process. When the practicum process changes, however, they expressed a need for the system to be more flexible and to adapt to the process. Participants also felt motivated to use the system and they believed others should use it as well. This section discusses four categories related to theme 1: (a) beliefs about practice experiences, (b) job-seeking, (c) the system and the APE process, and (d) uptake and motivation.

Beliefs About Practice Experiences

Codes in this category captured values and beliefs about practice experiences among participants. The ability to compare different types of opportunities, be exposed to different careers, and build relationships with practitioners in the field were all valuable components of the practice experience identified by participants. Overall, participants expressed positive perceptions about how MySPH supports these processes.

When describing what she likes about the current MySPH system, Elise (a faculty advisor) talked about the value of displaying a selection of potential practice opportunities from which to choose:

> Yeah, for me what I like most is I think it exposes students to different careers, different opportunities because it's all there in one place and they can peruse at their leisure and so maybe they're interested in going to PT school, but there's a really cool posting for cardiac rehab and so they give that a chance…we've had several practicum students who have gone to that location and then changed their careers because they were exposed to that.

In this case, the opportunity for students to be exposed to different types of careers is beneficial for both the student and for the practice sites. From the student perspective, Ben notes that students may not really know what they want, so having a system that gives the ability to quickly compare different sites and careers is important:

> I think [MySPH] breaks down into different categories. Like what different type of position this is, whether it's athletic training, physical therapy, which I like, because I was able to literally just go through because I'm going into PT. I was like, okay, well, let's just go down the list…and that made it really easy.

Practice experiences have value because they allow inexperienced students to apply skills learned in class in a professional setting alongside practitioners (Smith & Crocker, 2017). Starting out, however, students may not know exactly what they want to do, so a system that provides functionality to compare potential practice experiences, and match with an appropriate practice site, was important to participants.

As Elise (f) also notes, she uses MySPH to "help facilitate relationships between our students in practicum prep and our community partners." Rebecca, a preceptor in a cardiac rehabilitation department at a partner hospital, reinforces this idea when she says, "I love that I have the ability to reach out to interns, whether they're graduate or undergraduate, to come in and do their internships through the program" and later states, "if you're excellent here, we're going to hire you." Jake, a student, describes MySPH as a "gateway" to communicate with internship sites.

Participants noted that MySPH helps to facilitate these connections by giving students a selection of potential jobs from which to choose and a way to connect with preceptors. If students are successful in their APE, partners in the field are eager to hire students once they graduate.

Job-seeking

Another key consideration for developing a system to support the APE process is to help students learn job-seeking behaviors. Participants talked about the value of having undergraduates practice completing resumes and job applications in preparation for applying to an APE as part of their course work. They identified having a resource to "simulate applying for a job," provide "real world experience of how to apply for jobs," and job application "trial runs" as an important part of building job-seeking and application skills.

During that process, both faculty and students mentioned that it gives faculty the ability to review, provide feedback, and answer any pre-interview questions before students begin directly applying for jobs after graduation. Faculty were also able to review resumes to ensure proper formatting and content, as well as review that students

were answering application questions appropriately. Faculty and students valued having a system that simulated these processes as part of the curriculum.

Jake (s): I was in a practicum preparation course, and we started using opportunity manager to connect to work sites that were looking for student interns. It was just sort of part of the curriculum.

Beth (f): So, we try to do the practice assignment first, give them the feedback on there before the other ones start coming in and going live because we don't want the students applying to them without knowing what they should be saying and how to say it.

Elise (f): I was just going to say, from the student perspective, it's a really helpful tool, I think. And maybe when you interview students, you'll hear this moment back about actually for some of our students, they've never applied to a job, and specifically maybe one in their field. So, this is a really great way for them to gain that skill…yeah, so it's just really helpful that they're getting exposed to this kind of thing before they graduate.

Research has shown that students perceive internships and practice experiences, as well as faculty providing career guidance, as important contributors to career development and success (Mallinson & Burns, 2019). Participants identified MySPH's ability to facilitate this career guidance and simulation of the job application process as important supports for the APE process.

This System and the APE Process

Offering variety and choice in APEs and building job-seeking skills were both identified as valuable by participants when discussing MySPH. When talking about specific aspects of MySPH that support (or present barriers) to the APE process, participants had both positive and negative perceptions about the system. They expressed satisfaction with the ability of MySPH to capture, organize, and track information related to the practicum. When the practicum process changed schedule or was not well-aligned to the design of MySPH, however, participants expressed frustration that MySPH could not adapt to the process.

Capturing information is a critical feature for an APE tracking system to monitor the process and provide documentation of practice experience work products and activities (Lorenzo & Ittelson, 2005; Qualters, 2010). Greg (f) notes that there's "power in information" and discusses the importance of using MySPH to capture information:

> So essentially, I use it to track to make sure that all of the students who are supposed to be completing experiences are uploading that information and that we capture all that information…And then also manage the day-to-day activities, such as things like tracking where they do these placements and setting up the contracts to make sure that they're legally placed and all those kinds of things.

In his role as a practice coordinator and as a member of the school's accreditation team, Greg uses this information both for general reporting and to support "reporting that we have to do with the big accreditation."

Participants representing each role also talked about using the information in the system "to keep a quick eye on things," "keep track of who's applied, or like who's

posted," and "make sure nothing's falling through the cracks." The ability to use the system to monitor the process served an important function. In addition, staying organized was a recurring theme when talking about information capture within the system:

Jake (s): So, I liked how it was organized and balanced with my schoolwork.

Emma (s): I'm a really organized person anyway. But I think someone who is not as organized and doesn't have everything all in one place, it kind of makes sure that if they need to, they can go back and see all the different products and have it all just in one spot.

Greg (f): It helps with organization, and it helps keep everyone on the same page.

When reflecting on how the system operated, participants identified this ability to capture information for reporting, monitoring, and organization purposes as positive aspects of the system.

Participants also noted that the APE process does not always go as planned – dates can change, duties may have to be modified, and steps in the process may have to be rearranged. Greg (f) discussed the lack of predictability and the need for MySPH to be able to adapt to unplanned changes during the APE in order to keep user burden low:

> Because most of the grad directors are pretty flexible of like, okay, you have time to do it now, or the opportunities open up in the community now, go do it. I think that happens more than you think…it's not always on the clean academic semester

> timeline, and I try not to make it that way. Because then it puts a burden on partners and students.

A system designed to document and track APEs must be able to adapt to these changes easily. A lack of flexibility to accommodate changes to the process leads to frustration among system users. Emma (s) summed up these concerns when talking about tracking her practicum using MySPH:

> Because for example, my final work product was a presentation in disseminating back to DIAC, and WIC and it needs me to upload all five documents, so my final work product is my final presentation. So, I had to just upload it twice because it wouldn't let me submit the project. And I wrote, obviously, in my final report, that my final work product is a presentation. Dissemination back to the stakeholders is the whole purpose. That's the whole purpose of what I was doing. And so that was frustrating…why can't I submit it and get my final passing grade?

Emma gets at some of the key elements of experiential learning that the system is supposed to support: the process of concrete experience, and the transformative process of reflection to form new ideas (Healey & Jenkins, 2007; Kolb, 2014). Because her final practice experience artifact is a presentation to the community partners, and MySPH is designed to only accept documents as work products, it does not fit the workflow of Emma's practicum process.

That can cause users of the system frustration, and it runs counter to the experiential learning cycle. She needs to work around the design of the system and submit her work on a compressed timeline, which creates challenges for the necessary process of exposure to new experiences, reflection, generating new ideas, and

experimentation (McLeod, 2017). That lack of flexibility means that the system presents a barrier to the process rather than providing support.

Uptake and Motivation

When asked directly about whether they were required to use MySPH, participants had a variety of answers, including that they were not required, they were not sure, and yes, they were required. The follow-up question of whether they would use the system even if they were not required, however, resulted in a yes response from all eight participants. Even if use was not mandatory, participants were still motivated to use the system because they saw it as helpful to themselves in some way:

Ben (s): So, I can apply to five sites in 20 minutes, whereas it would take me 20 minutes to drive to the first site to speak. I think it's just a convenience thing.

Beth (f): I used to, like I said, my grad assistant and I would be here like all day Saturday and Sunday going through resumes and sending them and tracking everything ourselves. And yeah, [MySPH] made it a million times better.

Taylor (p): I don't have any other ways of communicating with the students. I think it's an easier platform to use, because they can all look at it in one place.

Faculty advisors were the main participants to talk about why others should use the system, but interviewees generally agreed that uptake by others was important. For Beth, preceptors needed to use the system to hire students and for visibility:

> Well, for our preceptors, we have plenty of community partners who choose not to use it, but then they don't get the practicum students. And this platform is just very useful to get their name out there.

Greg (f) expressed his desire for more faculty to use the system when he said, "I wish some faculty might utilize it more readily" and considered ways to motivate more faculty to use the system:

> [I]nstead of trying to find the email or the file, [faculty] simply can go in, go to insert student's name, and then download the work products, which showing them that in some of our accreditation meetings. I think that was a little eye opening to show the benefit of how much easier and better this is for accreditation in particular versus having to try and have those files off somewhere else.

Higher uptake of the system allows for more effective matches between student and partner sites, better visibility for community partners, and more comprehensive information capture and reporting. In addition, Greg felt there that there were unrealized potential benefits for faculty who could be using the system but were not.

Theme 1 consisted of four categories related to how MySPH supports the practice experience process: beliefs about practice experiences, job-seeking, the system and the APE process, and uptake and motivation. Participants valued choice, exposure to different careers, and connecting with partners as part of the APE process. A system like MySPH can be a useful tool in helping to build job-seeking skills and facilitating career development support provided by faculty. When there are unexpected changes to the practicum process, however, participants articulated a need for the system to exhibit greater flexibility and adaptability. Despite these challenges, and because of the provided

benefits, motivation for using the system was high among participants, and they expressed the desire for other students, faculty, and preceptors to use the system as well.

Theme 2: Reacting to Technology

Participants experience negative emotions and reactions when technology is not designed to function in clear and predictable ways that align with their expectations and beliefs. Theme 2 relates to expectations participants have for how technology should behave and how they react when these expectations are not met. The findings provide insight into how potential users would like to see a system such as MySPH function. This section covers three categories: (a) predictability, (b) emotional reactions, and (c) security concerns.

Predictability

As participants talked about MySPH, they expressed a variety of expectations about how technology in general should function. One theme that participants repeatedly talked about was how confusing the system was. During coding, a closer examination of comments related to confusion showed that in many cases participants could not predict what the system would do. For example, Beth felt apprehension when "figuring out which button I'm supposed to push for what I'm wanting to do." Choosing the wrong button could have unintended consequences, and so she must take extra time to decide which button is the most likely to be correct for the action she is trying to perform.

Taylor and Emma also discussed the confusion and irritation they felt, which was caused by unpredictability:

Taylor (p): I never - like if somebody applies for the position, I don't get notified of that. I don't know if that's an issue that I have to go

back in and do, but I don't get email notifications or anything like that, that somebody has applied to the position. So, I'm constantly going to go in and check it.

Emma (s): When you save the page, it doesn't really change. So, I think sometimes you get confused in being like, oh, did this actually save? Did I accidentally submit my entire project? You don't really know what happens with it…And it just refreshed the page, and I was like, did it save? Can I close my browser? Is everything okay?

A lack of predictability for system users can increase both mental burden, where the system requires a significant attention or concentration, and time burden, where the system requires frequent use or a significant amount of time to use (Suh et al., 2016). In addition, Brave and Nass (2007) note that unclear and unusual responses from technology are a common design mistake that leave a user in a state of uncertainty and can cause anxiety. For interviewees, this increase in burden and uncertainty caused frustration, irritation, and other negative emotions.

Emotional Reactions

The participants described a range of emotional reactions associated with using the system. Reactions to specific features or processes manifested themselves in other ways (e.g., being frustrated at not being able to find the site the first time, or not being able to submit their finished project) and are discussed in other sections. Additional emotional reactions, however, manifested themselves as participants were talking specifically about how they felt when using the system. This category is related to

emotions associated with using the system as well as the comfort level participants feel when using the system.

Taylor expressed mild embarrassment when asked about challenges he encountered using the system: “that last one could be user error, so don’t laugh at me.” He felt that he should know how to use the system more effectively and describing his lack of knowledge about specific features produced embarrassment.

Rebecca experienced exasperation when she could not use MySPH as intended. Although she is describing a specific feature (posting) in the passage below, there was exasperation in voice when explaining that she was unable to access the system:

> Interviewer: Overall, now that you've been back into it and you're posting again, how comfortable are you using the system this point?
>
> Rebecca: I haven't been able to post.
>
> Interviewer: Oh, you haven't been able to post?
>
> Rebecca: I haven't even got that far to post.

Rebecca later expressed longing to be able to use the system again when she said, “I really want to get back. I want our hospital back in there again, too.” Emma (s) expressed irritation at the level of expertise she was required to have when starting to use the system:

> Because I think that, in general…that we're just expected to know what we're doing and know what we need to upload and know how to get to the website and know how to use the website and know all these different steps.

Despite this irritation, Emma offers a solution to the problem when she says, “maybe if someone did some sort of like, just 10-minute training…I think that would be helpful.”

Later in the interview, Emma also says that after the initial negative reaction, the system ended up being “relatively straightforward” and that she was currently “like a 9 out of 10” on comfort level when using the system.

Another specific negative emotional reaction of note was the system causing fear. Beth (f) mentioned a specific example where students apply for multiple slots posted for a single position. After the preceptor accepts an application for the first slot, all other applicants receive an automated message saying their application was declined. Beth says, “But the very first one, everyone got a decline, and it just freaks all the students out.” When considering design and functionality improvements, the causes of these negative emotions should be addressed, as they can increase user anxiety, decrease perceived user competency, and lead to decreased engagement with the system (Asawa, 2009; Jones, 2010; Meishar-Tal & Levenberg, 2021).

When asked how comfortable they feel using the system, all participants except Rebecca (who was unable to log in to the system at the time of the interview) noted that they felt very comfortable and expressed self-confidence in using the system.:

Ben (s): I would say I'm pretty much as comfortable as I can be.

Greg (f): I’m probably the most comfortable person outside of you and [the developer of the MySPH].

Elise (f): There's very rarely a time where I don't know what I'm doing, so I feel very comfortable, yeah.

These reactions were more positive and suggested that despite some of the negative emotional reactions, overall comfort was still high. Increases in self-confidence and

comfort-level when using technology can positively influence feelings of ease-of-use, self-efficacy, and usefulness (Malureanu et al., 2021; Venkatesh et al., 2012).

Security Concerns

Although only one participant mentioned having security concerns, they warranted their own category since they have a significant impact on trust and user intentions to use technology (Merhi et al., 2019). Privacy and security concerns are characterized by an individual's ability to control the disclosure of personal information, and the confidence that the technology in question has the proper security management in place to safeguard personal information (Metzger, 2004; Tan et al., 2014) When talking about who could see his information, Jake (s) reflected on the security of MySPH:

> Sometimes I do wonder, oh, I'm uploading my resume. Sometimes I have to upload, answer questions and stuff like that. And sometimes I'm just thinking about the site security of it overall. But again, it's a very minute kind of thing. At the same time, I don't know what a hacker would even pull out of this site if it was breached. But again, I don't know.

Because MySPH functions as a job matching system for students, it collects application-related data such as contact information, resumes, cover letters, and demographic information. Demographic questions include age range, race, major, and year first enrolled. While this information may not necessarily be considered highly sensitive personal, health, or financial data, it could be used to identify system users. Regardless of the sensitivity level, mitigating privacy security concerns by putting the proper controls in place and communicating to the user how personal information will be protected are

critical to building trust, encouraging use, and supporting technology acceptance (Merhi et al., 2019).

Theme 2 covered three categories related to participant expectations and reactions to MySPH: predictability, emotional reactions, and security concerns. Participants expressed frustration and irritation over a lack of predictability when interacting with MySPH. Other negative emotional responses to day-to-day interactions with MySPH were also common among participants when the system did not behave according to their expectations. Despite these frustrations and concerns, almost all participants expressed a high level of comfort and self-confidence while using the system.

Theme 3: Training and Support

Participants express positive perceptions about learning to use the system and on-going support, but experience frustration with ease-of-navigation and knowing where to go on the MySPH site. Theme 3 related to how participants perceived training and support when using the system. While they generally had positive perceptions about starting to use the system and the provided training, finding the site and ease-of-navigation were two issues raised by participants. Participants mentioned a variety of training methods but explained that they generally became proficient using the site fairly quickly. Participants had positive perceptions toward support overall, with most relying on faculty advisors as their first option for requesting support. The four related categories covered in this section are: (a) finding and navigating, (b) starting, (c) perceptions about support for this system, and (d) performing support.

Finding and Navigating

The ability for participants to find the site for the first time, and the related topic of navigating to the proper place once in the system were raised by four of the participants. When they were first introduced to the site, and before they could log in and begin using it, participants expressed that they would have liked help or more guidance in getting to the site. Related to this concern was establishing how to navigate through the site and determining how features were supposed to work if they were using the system without a designated support person to answer questions. Participants expressed difficulty with both areas since there was limited training and support.

Ben (s) in particular had a difficult time finding where to log into MySPH for the first time and identified it as his primary challenge to starting to use the system:

> And I got to the site, and I couldn't figure out where the opportunity manager was at first because it was like the MySPH home or like my source for public health. That's all we were talking about. And I couldn't figure out where to go.

When asked about difficulties using the system, Jake (s) said the system overall was easy to use, but "finding the specific location of it…really just the location confusion" was the biggest challenge for him. Spending time finding the site created frustration for users and posed a challenge to using the site properly.

Perceptions about navigation within the site were more mixed. While two participants described the system as "easy to navigate" or "very easy to navigate," Beth and Rebecca both specifically mentioned their difficulty finding where things were once in the system:

Rebecca (p): Yeah, even just getting into the system, it's a little difficult to get in there and navigate.

Beth (f): Well, to me, sometimes I don't know if I click on opportunities, just like right now when I'm navigating, and then sometimes you click on the manage, and then, I don't know, I just have to think, and then if I come to opportunities, see, this is what I was looking for earlier, and I just realized I had clicked on opportunities and not manage.

The inability to find things in the system if they are using the site on their own and having to constantly think about where to go to perform necessary actions have the potential to create higher levels of mental and time burdens. These challenges can be factors that lead to negative emotional reactions and decreased satisfaction with the system (Meishar-Tal & Levenberg, 2021; Suh et al., 2016).

Starting

The category of *starting* captured ideas of how participants first encountered or learned to use MySPH and their perceptions of the process. There were a range of ways and reasons for people to use the system for the first time, and they varied among the roles. For students, their faculty advisors, or a class requirement to use MySPH were the reasons they first found and started using the system. For preceptors like Rebecca, using the system was recommended by colleagues:

> So, I heard about opportunity manager through one of the other cardiac rehab programs at Lexington Medical Center…one of my colleagues that works for the competition, he recommended that I get involved with that. And so, we started.

Faculty participants first started using MySPH components as part of their jobs to better meet tracking and documentation requirements. Greg summarizes the faculty view when he says:

> We started using APEX to make a better tracking system for student practice experiences…this was a better way to capture the proposal, but also the deliverables and any other relevant items we might want to collect.

After encountering the system for the first time, participants had similarly varied ways of becoming comfortable and proficient using the system. When asked how she learned to use the system the first time, Emma (s) said "myself" with no further help from others. Rebecca (p) had a peer showing her how to use the system:

> When I started using it, it seemed easy, and I didn't have any issues with it. But I also had somebody helping me through it and coach me through it step by step to make sure that I had gotten it right.

Beth and Greg, both faculty advisors, learned by going through the system with the original developers, then they created training materials for others. Elise, the third faculty advisor, learned the system from observing and learning from Beth:

> I observed how Beth did it, and then another former instructor, Allison, how they ran the class, and especially becoming familiar with it, but also familiar with it enough to talk, tell students how to set up their profile. So, just seeing how that happened, that's how I became familiar with it.

Training materials developed by faculty included instruction sheets, PowerPoint slides, and class modules. After learning the system initially, faculty became responsible for providing training to students and preceptors. There was no dedicated, planned training

strategy identified by participants; instead, the training strategy had emerged over time, and experienced users helped others.

Despite the seeming lack of a focused training strategy, participants expressed positive attitudes and perceptions about learning the system, saying “I think it’s relatively easy to pick up and use,” “I picked up on it pretty quick,” “I think training for me is not so much of an issue,” and “it was not a problem at all.”

Perceptions About Support for This System

When discussing support provided for MySPH, participants expressed mostly positive perceptions and experiences. Most interviewees said they felt comfortable requesting support, and that provided support addressed their needs:

Emma (s): And I think everyone, at least that I've been in contact with him feels very comfortable reaching out to [the faculty advisor] if they have issues, and he's always willing to help.

Beth (f): The school has always been very prompt at responding and resolving the issue.

Jake (s): I would say the school did a fantastic job with teaching me how to find the solution to the problem. So, I would say that was a great resource.

Overall, students, faculty, and preceptors all expressed satisfaction with the support provided by the school and were comfortable requesting support when they needed it.

The one exception in this view was Rebecca, who explained, “I had such a hard time working on [MySPH] - I’ve called for help, I’ve emailed for help, and I still don’t have my positions posted.” Rebecca had a specific problem that she was unable to

resolve, and she could not get a response from support, which caused a great deal of frustration when talking about MySPH. Lack of responsiveness from support did not show up in the other interviews and Rebecca was the only participant who had a negative experience.

Performing Support

Participants identified a variety of strategies for obtaining support and overcoming challenges when using the system. One key finding when talking with participants was that they rarely requested support, and when they did, it was not necessarily through formal channels from system maintainers (e.g., submitting a help request). Instead, faculty advisors were the primary providers of support.

When asked about what they did when needing support, participants mentioned that they first used trial and error, workarounds, and other attempts to troubleshoot their own issues before requesting support. Taylor, a preceptor, mentioned that he would not know who to contact to request support because, as he says, "I haven't really had any [issues] that would require support." Four participants mentioned the in vivo codes "trial and error" or "guess and check" when asked what they did when then encountered challenges using the system, and a fifth participant (Jake (s)) had a similar approach: "if there was like, something specific I needed to find out, usually I would just troubleshoot."

Students, preceptors, and faculty all agreed that if additional support was needed, the first strategy was to ask a faculty member:

Ben (s): In general, if you have an issue, I feel like your professor, if they're pretty competent, they can help answer any question.

Emma (s): And then when I had an issue with the documents, I contacted [my advisor]. He's just very quick. [He's] amazing. So, I think that he's always willing to help the students.

Taylor (p): I would either call or email the exercise science department and ask it to reach out or there might be something on the actual website that says customer support or something.

Greg (f): And then for students, I don't think there's loads of extra stuff other than I feel like, usually, if they're having issues, they typically will contact me.

All three faculty members felt confident providing support. They also identified the system maintainers as their support resource if they were unable to solve the problem, and they felt comfortable requesting support from them:

Beth (f): I always forward them to you, because I don't feel like we are versed enough, plus a lot of their issues we wouldn't be able to help with anyway, because a lot of it is creating their profiles.

Greg (f): And then if I'm still running into an issue, then I'll typically contact y'all's office, you and [the website developer], just to be like, hey.

Participants generally felt confident attempting to solve their own problems, but if they had a question they could not answer, their primary strategy for obtaining support was to first ask a faculty member.

Finding the site and navigating within it were the two main issues that participants mentioned as a source of frustration when starting to use MySPH. Once they were in the

system, they did not necessarily see the need for in-depth training materials, and their first strategy for solving any problems they encountered was to troubleshoot themselves. If they were unable to solve the problem, students and preceptors relied on faculty advisors for support. Faculty advisors felt comfortable escalating requests they were unable to handle to system developers and maintainers.

Theme 4: How the System Operates

Participants express positive perceptions toward the current MySPH system but indicate specific features and functionality could be improved to better meet the needs of system users. Theme 4 relates to how participants perceive the system, how they feel about specific features, and what suggestions they have for how the system could be improved. This theme covers four related categories: (a) descriptions (summaries) of the system, (b) perceptions about the system, (c) features, and (d) recommendations.

Descriptions (Summaries) of System

Over the course of the interviews, participants offered short summary statements about the system such as, "it's a vital piece for us," "it helps make my job easier" and "it's just a great tool." Students, faculty, and preceptors all offered positive summaries of the site, with the in vivo code "one place" being used most often (by five participants) as a specific positive attribute:

Elise (f): It's all there in one place.

Emma (s): It is nice to make sure that you have everything all in one place.

Taylor (p): Yeah, it's nice that I have one place to go to, to pull everything from, and I can see everything that I need to.

Participants indicated they liked that the system kept all related files and tracking in a single place, and they did not have to use other systems to track the APE process. "Straightforward" was also used by four participants when talking about the system, as well as words and phrases like "good to go," "convenient," and "helpful" to summarize the system.

Perceptions About the System

Perceptions about the system underpinning the short descriptive statements were slightly more nuanced, and participants tended to elaborate more on attitude toward the system and satisfaction level. Participants expressed overall positive perceptions of the system, and they described it as simple, as opposed to complex, and easy to use. These positive perceptions corresponded to a high level of satisfaction with MySPH among interviewees.

The concept of simplicity when designing technology and products has been shown to significantly influence user satisfaction (Calvo-Porral et al., 2017; Still & Crane, 2017; Tsekleves et al., 2011). Technology designed to be simple and intuitive leads to higher levels of satisfaction. All eight participants described the system as simple or easy to use. Taylor (p) and Ben (s) both used the words "pretty simple" when talking about the site overall, and Emma said, "I don't think it's too complex."

For those participants that had negative emotional reactions, security concerns, or other negative responses to specific processes or features, such as Ben and Rebecca, the overall perception of the system was still positive:

Ben (s): I thought after the first time I used [MySPH features] that they were pretty easy, pretty quick to catch on to. It's more of the

finding out how to use it part that took me a while. After that, I thought it was extremely easy.

Rebecca (p): And then it was very easy once I got in there to put the objectives and the expectations, that was very easy.

These positive statements were accompanied by participants expressing satisfaction with the system overall. Reflections on the system included statements such as, “I like a lot of what’s on MySPH,” “I would say it definitely worked for me,” and “I think the system is pretty good for the most part.” Participants did mention things they would like to change, which will be covered in the discussion of feature and recommendation categories, but they described their overall experience as positive.

Features

When talking about specific features, participants discussed what they liked and disliked in terms of system functionality. Relating back to the idea that the system is simple, three participants said they could not necessarily identify good or bad features since the system operated as it should for the basic functionality it offered. Taylor summed up this sentiment when he said:

> I don't really know all that's on it, or what it could be potentially used for. So, I feel like I'm jaded on that question. I can't necessarily answer it fully because I only use this piece of it. If I'd used more of it, I might be able to give you more.

Participants thought they might not be knowledgeable enough to talk about specific features, since the tasks they performed in the system were limited and functioned satisfactorily.

Faculty advisors were the most consistent and advanced users of the system and were thus able to speak with more confidence about specific features. As MySPH administrators with higher user privileges, Greg and Beth both mentioned they liked the ability to impersonate other users in the system, which allowed them to troubleshoot issues:

Greg (f): I also use the login to other student account features to check because if they email me saying, I have this issue, something's wrong, I will go in on their side and be like, okay, when did you upload all of this stuff?

Beth (f): For our role, since we have a dual kind of role with it, like if there's a way for us to kinda select how we want to view it, so do we want to view it like if we're applying to something, or do we want to view it more like the kind of community partner preceptor role, and be able to pivot back and forth.

Although this feature would not be available to students or preceptors, both Greg and Beth listed it as a favorite. Greg also talked extensively about how he liked the system's ability to track, monitor, and manage information:

> I think another feature that I use very regularly is just looking in the system to the in-progress, submitted, approved…and just being able to download it into a CSV file. Because as you know, I had an undergraduate intern work in my office this past semester, and I was teaching her some descriptive coding and we used that data. That was really helpful.

These are, again, administrative features, but are identified as favorite MySPH features nonetheless since they are used to support the APE process.

Two specific features participants did identify as needing improvement were the notifications the system sent and printing materials from the system. Three participants talked about how they did not know when automated notifications were sent for specific actions and who received them. For Emma (s), the consequence of this confusion leads to doubt and fear about how the system operates: “I don't know if I'm being annoying and things like that. I just don't really understand if it sends automated emails or communication or anything.”

The second specific feature that caused a strong negative reaction from one participant (i.e., Taylor) was the inability to print correctly from the system:

> They won't print in a nice fashion. At least I haven't found that. I have to go through and copy and paste. And when I copy and paste, it doesn't turn out, like break it all apart to get it to transfer to a document to print off easily. That's a pain. I don't like that.

As noted in previous sections, features that cause confusion or strong negative emotional reactions can cause anxiety and should be addressed. Overall, feelings about specific features were mixed, with some participants feeling positively about specific features, some identifying features they did not like, and several saying they did not feel qualified to speak authoritatively.

Recommendations

Participants offered a number of recommendations related to training, support, and potential design improvements. Specific items participants mentioned for possible

training improvements were brief video resources for learning the system, a dedicated support FAQ, and interactive training sessions:

Taylor (p): I learned pretty well from just reading the document that [the faculty advisor] sent out, but I know some people can learn better by just doing a step-by-step video tutorial that takes 30 seconds.

Elise (f): If there's a video from an expert, I would be more than happy to let that play instead of me troubleshooting with them.

Ben (s): I think maybe even like a frequently asked questions page. Because like I said, the site is so simple. How many questions can one really have? So, if you're able to just do all the different frequently asked questions, do that.

Greg (f): I mean, the only thing I could think of is maybe I can host some kind of like interactive session with faculty or students.

There was little consensus on recommendations for design and feature improvements, which were varied and covered several different aspects of the site. Two participants recommended a more sequential workflow when completing tasks within the system:

Rebecca (p): The easiest way would be more yes, no. And if this is what you want to do for intern, this is what – like an algorithm and just follow step by step by step exactly what to do. And make it more basic, like yes, no.

Emma (s): So, you kind of go maybe more into like a sequential order of what you're supposed to upload. I think that might be beneficial. And if I was creating this system, I think that I would do that, just

> to make sure that everyone's following it in the order that they're supposed to.

Other recommendations included adding more tracking of visitors, separating out in-class practice opportunities from live postings, allowing students to save their progress on applications, and adding more personalization features. Additional features and decisions about design improvements would need to be considered in the larger context of findings from the other themes and categories.

When describing the system or offering their perceptions about MySPH, participants generally had positive things to say. If they felt confident enough to comment on specific features, they also spoke positively, with the exception of confusion about how notifications are handled, and the issue raised by Taylor about the printing feature. Participants did offer recommendations for improving training and support, as well as individual items each would like to see.

Open-ended Survey Questions

The last five questions of the survey asked open-ended questions about the most and least valuable features, recommendations for making the system easier, improving on-going training and support, and any other comments participants had. Major themes that emerged for most valuable features were opportunity availability and tracking, document management, and organization. When asked what they liked about the system, sample responses included, “it’s easy to find internships for my skill set and interests,” “ability to find students for practicum site,” “ability to upload documents,” and “the organization, especially of the opportunities and the places applied to.” Participants liked that MySPH provided an organized, comprehensive list of opportunities, that the process

and documentation could be managed in one place, and that MySPH helped to match students to practice experiences and sites.

Least valuable features included the lack of user-friendly design, difficult interactions with the system, and out of date information. Responses related to lack of user-friendliness were the most frequent, with participants saying, “I don’t like how it can sometimes present a lot of information at once,” “it is not user-friendly,” and “a lot of info and things all over the place.” Difficult interactions with the system included, “you can’t type into the question boxes and save it for later,” “it is extremely cumbersome to post 10 separate listings,” and “it will not let you move past and upload later, just so difficult.” When talking about outdated information, participant had the following comments: “some information is out of date for businesses,” “lack of opportunities posted and updated,” and “old opportunities…one currently posted in 2009.” Although participants mentioned a variety of aspects and features of the system they did not like or did not find valuable, the most common response was the lack of user-friendly design.

Participants offered a range of suggestions both for general system improvement and improvements to training and support. General improvement recommendations related to addressing user interface concerns, building awareness about the system, making site navigation better, and addressing privacy concerns, but suggestions for improving training and support were the main topics mentioned by participants. User interface recommendations included, “have it be updated regularly,” “make it load faster,” and “ability to save work and come back later.” Participants also felt the communication strategy for making people aware of MySPH could be improved: “more information about it on the USC website,” “maybe making students more aware of it so

they know these resources are available," and "the Arnold School should mention this to students more so they can use it." Suggestions for navigation improvement included, "make it easier to navigate," "more clearly labeled, easier to navigate," and:

> I would recommend removing the unnecessary links such as "manage applications" and "manage opportunities" as there should be one combined place to see all active applications/opportunities.

Specific privacy suggestions were somewhat unclear, but included, "fix layout and make sure to fix privacy things," and a mention of "the importance of privacy."

Participants were mixed when talking about perceptions of support and training, expressing both positive perceptions (e.g., "I feel like the training is already pretty good" and "the support is great") and negative perceptions (e.g., "more in-depth training would be better" and "provide training"). Specific improvement suggestions related to support and training were more common, with adding a FAQ section (e.g., "have a FAQ section" and "add a help center maybe or a faq"), having real-time support (e.g., "an online chat to get help" and "live chat), and adding short instructional videos (e.g., "more help videos" and "video tutorials") being the most frequent recommendations among participants.

Although there were a wide range of themes and specific items that emerged in the open-ended questions, responses were positive overall, with participants offering the following thoughts on the system: "APEX makes my work life a lot easier," "I like it very much," and "this has been a wonderful tool." Participants liked that MySPH gave them access to opportunities, helped to manage the process, and kept them organized. Ease-of-use was the primary negative feature participants mentioned, along with out-of-date information. Recommendations for improvements centered around making the

system easier to use by improving the user interface and making potential users more aware of MySPH by increasing communication about the system. Finally, while participants were somewhat mixed when talking about perceptions of training and support, top suggestions included adding FAQs, making support more responsive and available, and adding video training resources.

Chapter Summary

Quantitative data from surveys and qualitative data from semi-structured interviews both provided insights into how participants perceived the system, what they liked and did not like, and how they ranked each construct. Qualitative findings showed somewhat similar results, with overall positive perceptions and reactions when talking about the four major themes of supporting the process, reacting to technology, training and support, and how the system operates. Participants expressed strong reactions when talking about features of MySPH that they viewed negatively, and they provided specific recommendations for improvements to the system. While UTAUT and UBS constructs generally had positive scores among survey respondents, the open-ended questions about recommendations provided specific areas participants viewed as needing improvement and provided additional triangulation and corroboration of qualitative data.

CHAPTER 5

DISCUSSION, IMPLICATIONS, AND LIMITATIONS

The purpose of this descriptive action research was to evaluate the practice experience tracking system and make recommendations for improvements to document and report on applied practice experiences (APEs) and academic-practice partnership activities that satisfies accreditation criteria, uses up-to-date technology, and meets the needs of all stakeholders. Based on the qualitative and quantitative analysis and findings presented in the previous chapter and the existing literature, answers to the following three study research questions begin to emerge:

1. What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and preceptors?
2. What challenges do students, faculty, and preceptors face when using the current web-based system?
3. What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?

This chapter will present (a) discussion of each research question, (b) implications, and (c) limitations of this descriptive action research study. In the following sections, interview responses are labeled by role, with students as (s), faculty as (f), and preceptors as (p) after each pseudonym.

Discussion

RQ1: What factors influence the intention to use or the actual use of the current web-based system by students, faculty, and preceptors?

There were a variety of factors that influenced participant use and perceptions of the system. To answer RQ1, the focus will be on performance expectancy (PE), effort expectancy (EE), attitude toward technology (ATT), and social influence (SI). Each of these constructs measure how participants perceive the system and provide insights into what motivates participants to use, or not use, MySPH.

Performance expectancy (PE) is defined as the degree in which a person believes using a particular technology system will help them in their work (Venkatesh et al., 2003). In this case, "work" for students is finding and completing an APE; for preceptors it is finding student interns or workers; and for faculty it is facilitating the practice process and matching students with APE opportunities with partners. Previous research has shown PE to be the strongest predictor of use and intention to use specific technology systems (Chao, 2019; Khechine et al., 2016). It is based on perceived usefulness, with a specific focus on increasing performance and accomplishing work.

Participants rated PE overall as positive, with general agreement among the scores (M=8.02, SD=2.91) on a scale from 4 to 20. Students rated PE most positively, followed by faculty, then preceptors. This was demonstrated in interview responses as well, with students speaking most positively about how the system was helpful to them. As Jake (s) indicates, "I liked how it was organized and balanced with my schoolwork." Students perceived MySPH to be helpful in completing their schoolwork related to the APEs, staying organized, and saving time during the APE process.

While faculty and preceptors had slightly less positive scores, they still reported positive perceptions as it related to work performance when speaking about the system. Beth, a faculty member, said MySPH made her job "a million times better" than the process she used previously, which involved tracking everything manually. Taylor, a preceptor, said "I don't have any other ways of communicating with students," and thus the system helped him with his work by coordinating communication related to practicum placement.

Survey scores and interview responses showed participants perceived the system to be useful and helpful in getting their work done. For all three stakeholder groups, the findings indicate that participants find value in the utility of MySPH overall and that they see it as helpful in supporting the APE process, keeping their work organized, and having all APE related materials in one place.

Effort expectancy (EE) was also scored on a range from 1 to 20 and is another area where overall scores were positive (M=7.74, SD=3.63). EE is defined as the level of ease and effort required when using a technology system, and is related to perceived ease of use (PEOU) in the technology acceptance model (Davis, 1989; Venkatesh et al., 2003). Previous research has shown individuals are more likely to use systems requiring less effort (Ain et al., 2016; Khechine et al., 2020). Students again had higher positive perceptions than both faculty and preceptors, meaning they found the system easier to use and felt it did not require a high level of effort.

Although all interview participants characterized the system as simple or easy to use, a more negative perception toward EE among preceptors emerged in a higher mean (M=10.50) compared to other groups. In addition, there was greater variability in

responses as indicated by a higher *SD* of 5.53. In interviews, the idea of the system requiring a high level of effort was reflected when preceptors talked about navigation and specific features, such as email notifications. Rebecca (p) provides an example of this when she says, “yeah, even just getting into the system, it's a little difficult to get in there and navigate.” When thinking about the system generally, preceptors described it as simple and requiring little effort; however, when focusing on completing specific tasks, they described it as requiring more effort. Preceptors are slightly different from students and faculty in that MySPH may be less closely related to their day-to-day work as public health professionals. In addition, they may use the site less frequently and have long periods of disuse if they are not actively supervising a student each semester.

Usage patterns among students likely differ from preceptors and faculty, which may account for the differences between EE among the groups. Students primarily use the system to apply for jobs and to serve as a repository for their APE documentation. They use it over the course of two semesters at most during their academic career, then are not likely to use it again. Compared to faculty and preceptors, students use fewer features over a shorter term. Faculty and preceptors use the system to review applicants, track the APE process, collect APE documentation and artifacts, and view reports. Faculty and preceptors may perceive that MySPH requires more effort because they are using more features than students over a more sustained period. Preceptors may also supervise students (and thus use the system) on an irregular basis. Having to relearn the system if they have not used it for one or more academic semester likely has a negative influence on preceptor EE scores.

It should be noted EE can change over time and become a weaker predictor of use and intention to use systems as time and familiarity using a technology system increases (Chao, 2019). Thus, despite faculty and preceptors indicating the system requires more effort to use, and usage patterns requiring preceptors to reorient themselves after periods of disuse, EE may not have a strong influence on their decision to keep using the system.

Attitude toward technology (ATT) was the most negatively rated of all the constructs (*M*=8.97, *SD*=3.86), with students, faculty, and preceptors again ranked in order from most positive to most negative. On a scale of 4-20, these scores were not strongly negative, but they were more so than other constructs. Sample survey questions to measure participant attitudes were "using the system is a good idea," "the system makes work more interesting," and "working with the system is fun." It could be that while participants acknowledge the system helps with their work and does not require high effort, they do not have strong positive or negative feelings about whether the system is interesting or fun.

These neutral attitudes were reflected in interviews where participants said, "I don't think it's too complex" and described it as "pretty simple" and "pretty good for the most part." While a positive attitude has been shown to predict increases in BI to use and actual use (Davis et al., 1989; Park et al., 2012), making a specific system used for "work" fun and interesting can be a challenge, especially if use of the system is mandatory (Brown et al., 2002).

Whether use of a technology system is mandatory or voluntary is also closely related to social influence (SI), which is defined as social pressure applied by others, such as peers and superiors, to use a specific system (Venkatesh et al., 2003). SI was scored on

a scale of 4-20 and had the lowest (i.e., most positive) scores across all constructs (M=7.15, SD=3.19), meaning participants agreed or strongly agreed with statements such as, “colleagues at work think I should use the use the system” and “my advisor or preceptor think I should use the system.” It is a measure of how those around participants influence their BI and use of MySPH. Students once again scored the lowest, but the margin was smaller than other constructs, with preceptors and faculty also having more positive scores compared to other constructs.

Interview data supported the strong social influence (SI) participants felt, even though they responded with yes, no, and they were not sure when asked if they were required to use the system. There was agreement in the survey data with students feeling the highest levels of SI to use the system. This is likely because they either responded they were required to use the system for class, or they were not sure if they were required, but thought they might be. The follow-up question, whether participants would use the system if they were not required provided insight into their motivations for using the system regardless of manditoriness, with Beth (f) saying, “this platform is just very useful for getting [the preceptor’s] name out there.” Greg (f) echoes this sentiment when he says, “I wish some faculty might utilize it more readily.”

Because they saw the system as beneficial in some way (e.g., increasing visibility for partners, supporting accreditation, and providing convenience), participants were both motivated to use the system and thought others should use it as well. In this way, SI is related to PE in that participants identify how the system can help them and others with their work, which serves as a motivator to encourage others to use the system. Previous research has supported this relationship by showing SI is a positive predictor of PE,

meaning users perceive technology systems as more useful when people important to them support their use (Nordhoff et al., 2020).

RQ1 was concerned with which factors influence participant use or intention to use MySPH. Based on the quantitative and qualitative data collected, SI was the strongest factor, followed by EE, PE, and ATT. Participants across all roles felt they should use the system and that others should as well, regardless of whether they believed use was mandatory. Students identified faculty as encouraging them to use the system and preceptors were influenced by colleagues and faculty in the school. Faculty were encouraged to use the system by their faculty peers as well. High levels of perceived EE and PE likely contributed to the strength of the SI factor. Participants felt the system was easy to use and that it helped them to be more productive in their work. If the system was difficult or not useful, participants would most likely feel less motivated to use MySPH and less likely to express beliefs that others should also use it. ATT was generally more negative than other measures, especially among preceptors, which could indicate an issue that needs to be addressed when implementing recommendations and plans for improvement.

RQ2: What challenges do students, faculty, and preceptors face when using the current web-based system?

When asked about challenges using MySPH, participants identified a number of factors that impacted their use of the site. To answer RQ2, the focus will be on difficulty of use (DOU), facilitating conditions (FC), self-efficacy (SE), mental burden (MB), and privacy burden (PB).

Difficulty of use (DOU) is related to perceived ease of use from the Technology Acceptance Model and is defined as the level of physical and mental burden required to use a system (Davis, 1989). Systems with high DOU are complex, require greater mental effort, and cause negative emotional reactions among system users, such as frustration and irritation. Measures of DOU should roughly correspond with effort expectancy (EE) in that if participants rate that a system requires little physical and mental burden, effort required to use the system (EE) should also be low. Measured on a scale from 4-20, the data reflect this relationship overall (M=7.22, SD=3.86) with students and faculty both in agreement that use of the system requires little mental effort or assistance from others. When describing the system, students and faculty used phrases such as, "very straightforward," "pretty simple," and "really easy."

As with EE, preceptors scored higher (i.e., more negatively) than students or faculty and raised the overall DOU mean. When examining preceptor responses specifically, there was a high degree of variability, which is reflected in the higher SD of 6.64. Total scores for preceptors (n=8) ranged from 4 to 19, with 2 respondents finding the system very difficult to use, and the others falling into a lower range of not at all difficult to somewhat difficult. For preceptors, these trends can also be seen in the interview responses. Overall, preceptors felt the system was not difficult to use, but they felt strongly when encountering specific challenges, as Taylor demonstrates when talking about printing student applications:

> They won't print in a nice fashion. At least I haven't found that. I have to go through and copy and paste. And when I copy and paste, it doesn't turn out, like break it all

apart to get it to transfer to a document to print off easily. That's a pain. I don't like that.

Taylor's frustration is evident, and that same frustration may be reflected in the preceptor survey responses that rated the system at the "very difficult" end of the scale. Because of the pressures of the job and often limited time and resources, preceptors may feel more frustration when faced with these types of technical difficulties than students or faculty (Leider et al., 2016).

Facilitating conditions (FC) are defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453). Infrastructure might include training to help users learn the system and/or on-going support offered by the organizations if users encounter difficulties. FC has previously been shown to have a significant effect on behavioral intention to use technology systems (Ghalandari, 2012; Gupta et al., 2008; Venkatesh & Davis, 2000). If users feel prepared and well-supported, they are more likely to use a specific system like MySPH.

Measured on a scale from 4-20, participants overall rated FC positively (M=7.82, SD=3.17) on a scale from 4-20, with students rating FC slightly better than faculty and preceptors. Open-ended question responses were somewhat mixed, with participants saying, "I feel like training is already pretty good," "the support is great," and "more in-depth training would be better." Qualitative data also reflected an overall positive view of FC, with some negative responses, such as when Rebecca (p) says, "I had such a hard time working on [MySPH] – I've called for help, I've emailed for help, and I still don't have my positions posted."

It is a possibility that positive perceptions of EE and DOU are contributing to positive attitudes about FC as well, despite the negative comments. If participants perceive that little effort is required to use a system and that difficulty is low, they may not feel a high need for intensive training and support. This view is supported by interview data when participants talked about learning and using the system: “I think it’s relatively easy to pick up and use,” “I picked up on it pretty quick,” and “it was not a problem at all.” While insufficient organizational support has been shown to hinder system uptake and use (McWhorter et al., 2013; Shepherd & Bolliger, 2011), the generally positive reactions and scores indicate that it is not a major concern for users of MySPH. Participants may have felt that training and support could be improved, but that they themselves did not have a strong need for it.

High levels of self-efficacy (SE) may also be contributing to decreased concern about FC among participants. SE is a construct from Social Cognitive Theory defined as a person’s belief in their ability to act in ways necessary to successfully achieve specific goals (Bandura, 1986). High degrees of SE can increase feelings of confidence, comfort, and perceived control, and can decrease stress reactions to challenging situations (Bandura, 1994). Participants reported high levels of SE, which was also reflected in the qualitative interview responses. High levels of SE were especially noticeable when participants spoke about their confidence and comfort resolving difficulties they encountered using the system. Elise (f) sums up this sentiment when she says, “there's very rarely a time where I don't know what I'm doing, so I feel very comfortable, yeah.”

When users feel high levels of comfort and SE, they are more likely to accept and use technology systems, have a positive attitude, and perceive the technology as useful and easy to use (Abdullah & Ward, 2016; Malureanu et al., 2021; Venkatesh et al., 2012). Users may also feel less of a need for extensive training and support if they feel comfortable learning and using the system on their own.

Relative to other constructs, mental burden (MB) measured as one of the lowest (most positive) scores with an overall *M*=3.52 and *SD*=1.99 on a scale of 2-10. Students, preceptors, and faculty all scored closely to one another compared to other constructs, with a slightly higher variation in scores among faculty respondents. A technology system with high MB requires "significant attention, concentration, or is distracting" (Suh et al., 2016, p. 3990). Despite the positive scores, survey respondents commented specifically on the MB required to use the system, including "I don't like how it can sometimes present a lot of information at once," and "a lot of info and things [are] all over the place." Interview participants had similarly negative comments when discussing MB, especially as it related to MySPH behaving predictably. Beth (f) felt apprehension when trying to figure out "which button I'm supposed to push for what I'm wanting to do." In addition, participants such as Emma (s) expressed confusion and irritation when tasks required extra attention: "you don't really know what happens with it…And it just refreshed the page, and I was like, did it save? Can I close my browser? Is everything okay?"

It is somewhat difficult to reconcile the positive scores among participants for MB with the negative comments in the open-ended survey questions and interview responses. It may be that, when asked specifically about what they do not like about MySPH,

participants are able to offer examples. However, they may also feel that MB overall is low, which is supported by the positive scores on other constructs, such as PE, EE, DOU, and SE. Negative comments about high MB may be overrepresented in open-ended questions and qualitative data since they do not correspond with the positive MB survey scores.

Privacy burden (PB) is defined as the risk of the system revealing information that the user would prefer not to share (Kientz & Suh, 2018). PB was measured by three questions, with a score range of 3-15. The overall score (M=4.04, SD=2.20) indicated that users did not feel a high level of PB, but it was the one construct where students (M=4.39, SD=2.26) scored more negatively than preceptors and faculty. When asked about suggestions for improvement, student respondents to the survey mentioned "the importance of privacy" and "make sure to fix privacy things." Although these were not necessarily specific suggestions, both responses spoke to the fact that students had privacy concerns. In interviews, the only person to mention privacy concerns was Jake (a student):

> Sometimes I do wonder, oh, I'm uploading my resume. Sometimes I have to upload, answer questions and stuff like that. And sometimes I'm just thinking about the site security of it overall. But again, it's a very minute kind of thing. At the same time, I don't know what a hacker would even pull out of this site if it was breached. But again, I don't know.

This higher level of PB from students could be because students are storing much more information in the system about themselves (e.g., resumes, cover letters, and APE work products) than either preceptors or faculty, which produces more anxiety in students

about exposing that information. It is important to account for PB concerns when designing technology, and have a clear statement about how information will be protected, to reduce barriers to acceptance and use (Hong et al., 2004; Merhi et al., 2019).

When asked to identify specific challenges using the system, participants were able to offer examples of what they did not like and discuss how training and support should be improved. These responses did not necessarily correspond to the more positive scores for each of the constructs as measured by the survey. The quantitative data suggest that participants find MySPH easy to use, are satisfied with training and support, feel comfortable using the system without additional help, and find the mental and privacy burdens to be low. When examining the qualitative data, however, participants were able to identify examples where they experienced complexity, burden, and dissatisfaction with the system. Students seemed to be especially sensitive to privacy concerns since they share a good deal more information with the system than preceptors and faculty. Both the positive and negative feedback should be considered when considering how the system can be improved and made less burdensome for all stakeholders, and when considering more specific recommendations covered in the next section.

RQ3: What recommendations do students, faculty, and preceptors have for the development of a new web-based system to track APEs and academic-practice partnership activities?

When asked about specific recommendations, participants had a number of suggestions that would make using MySPH easier, more useful, and would reduce effort. While other RQs have touched on features participants liked or disliked, and motivations for using the site, this section will cover specific recommendations, including (a) making

the site easier to find, (b) navigation improvements, (c) workflow enhancements, (d) general improvements to the user experience, and (e) making training and support better.

There were several responses in both the qualitative and quantitative data indicating that participants would like to increase the general awareness of the site prior to first use and for it to be easier to find. Raising awareness about the availability of MySPH was especially evident in the open-ended responses on the quantitative survey, with participants asking for "more information about it on the USC website," and "maybe making students more aware of it so they know these resources are available." In the interviews, participants focused on increased awareness of the site while talking more about difficulties knowing how to get to the site. This was demonstrated several times in theme four (finding and navigating) such as when Jake (s) said, "finding the specific location of it…really just the location confusion."

There are two areas where these recommendations could be implemented. The first would be as a matter of marketing the system, which could include making information about the system available on other websites, such as USC and Arnold School websites, clearer and more prominent. The second could be to maintain consistent terms when talking about MySPH so that potential users are not confused by "opportunity manager," "APEX," "my source for public health," and "MySPH." Simplifying and standardizing terminology, determining site users' preferred terms to describe the system, and reducing jargon are a key way to increase usability (Cirelli & Long, 2020).

Improving navigation within the system was another topic participants mentioned in both the open-ended survey responses and interviews and was also shown in

qualitative theme four. It was slightly more prevalent, with seven people mentioning it in the survey and three in the interview as a potential area of improvement. When accessing the site, participants often felt uncertainty about where they were supposed to go and how to accomplish specific tasks. As Rebecca (p) says, “yeah, even just getting into the system, it's a little difficult to get in there and navigate.”

Specific recommendations from the open-ended questions on the survey included “make it easier to navigate,” and “more clearly labeled, easier to navigate.” Although these recommendations are somewhat general, they indicate an issue that needs to be addressed when considering how to improve or replace MySPH. Any improvements should take into consideration navigability, which is defined as “the degree to which a visitor can follow a web site's hyperlink structure to successfully find information with efficiency” (Fang et al., 2012, p. 175). A systematic, data-driven approach to usability testing should be used to conduct an evaluation of navigability to determine how to enable participants to perform better, take a more direct route through the system, and increase efficiency (Pittsley & Memmott, 2012; Stefaniak, 2018).

The third major category of recommendations from participants was making the overall workflow and functioning of the system better. Participants had a number of suggestions for better matching the design of the system to the APE process, general user experience improvements, and reducing the amount of information presented. While the frequency of each recommendation in this category was low, taken together, they all fall under the umbrella of making the system function better as it relates to workflow and efficiency.

When talking about matching the design of the system to the APE process, participants recommended that the system operate more sequentially, with more step-by-step prompts and the ability to save progress when performing tasks. Rebecca (p) offered the following suggestion as a solution: "the easiest way would be more yes, no…like an algorithm and just follow step by step by step exactly what to do. And make it more basic, like yes, no."

Survey respondents also mentioned that they wanted the "ability to save work and come back later" and "you can't type into the question boxes and save for later." Elise (f), as well as three survey respondents, said that they had to create their applications in a Word document first. They then had to copy everything to the application at once since the system would not allow them to save incrementally: "I have to type my responses in a Word document then copy and paste and complete the application at once which is kinda annoying."

A redesigned workflow that guided participants through the system step by step could make saving progress easier and thus reduce the burden placed on users requiring them to manage their work using multiple applications. In addition, previous research has shown that step by step guidance can reduce effort expectancy and make systems easier to use (Barnard et al., 2013). Changes to the workflow could also reinforce the positive perceptions interview participants expressed of having everything in "one place" and MySPH's ability to keep their work organized.

There was little consensus on user experience improvement recommendations, but examples from survey responses included, "make it load faster," and "have it be updated regularly." Along those same lines, one respondent noted that "it is extremely

cumbersome to post 10 separate listings." Each of these requests relates to increasing efficiency, reducing effort, and making the system more useful. Three interview participants mentioned that they would like notifications to be more predictable, including Emma (s) when she said, "I don't know if I'm being annoying and things like that. I just don't really understand if it sends automated emails or communication or anything." Rules for email notifications could be standardized and clearly communicated to users so that they know which emails will be sent when specific actions are performed, or conditions are met.

Survey respondents also commented on outdated information and recommended old opportunities be removed from the system (e.g., "some information is out of date for businesses" and "old opportunities…one currently posted in 2009.") Removing these old, inactive opportunities would reduce the amount of information participants have to manage and reduce mental burden when using the system. Depending on how the change is implemented, it could also make the system load faster and increase efficiency. Once opportunity postings and applications have expired, they should be retained in the system for reporting purposes, but should not be visible to students, preceptors, and faculty.

The last major category of recommendations focused on improvements to training and support. Despite the positive perceptions of facilitating conditions shared by participants in the quantitative (M=7.82, SD=3.17) and qualitative responses (e.g., "I think training for me is not so much of an issue"), participants shared a number of specific improvement recommendations. The two main suggestions were to create video tutorials and to create a frequently asked questions (FAQ) section on the site. Interview participants suggested these two features multiple times, and they were also reflected in

open-ended survey responses, with respondents saying, “more help videos,” “have FAQ section,” and “add a help center maybe or a faq.” When speaking of videos, interview participants indicated that they should be short and cover specific topics to be most useful. Although video tutorial have been shown to be a less effective means of encouraging technology acceptance than in-person training (Mahardika et al., 2019), participants rated them as the preferred method for improving training. In addition, given the choice between little to no training and video tutorials, adding videos seems like an obvious improvement.

One recommendation that showed up frequently in open-ended survey responses, but not necessarily in participant interviews, was to add a chat support feature to the site. Respondents suggested having “an online chat to get help” and “live chat.” This could be due to a perception of lack of responsiveness by support. Applying for opportunities, communicating with preceptors and faculty, and completing schoolwork are all time-sensitive tasks for students, and the recommendation to add a live chat likely indicates that they feel they should be able to contact support in real-time. Adding a live chat would be one way to accomplish this, but an improvement in response times to support requests may also increase user satisfaction.

It should be noted that participants said in both qualitative and quantitative responses that overall, they were satisfied with the system, and they liked using it. Positive scores on effort expectancy (M=7.74, SD=3.63) and performance expectancy (M=8.02, SD=2.91), both measured on a scale of 4-20, support this, as well as statements like, “this has been a wonderful tool” and “I didn’t have any real issues with it.” Participants also said in both interviews and open-ended survey responses “I like it very

much" and "it helps make my job easier." Nevertheless, participants had a variety of recommendations for improvement related to building awareness, navigation improvements, workflow enhancements, user experience, and training and support. Those recommendations should be considered and help guide more comprehensive usability testing, improvements, and/or the design of a replacement system.

Implications

Although action research has a focus on addressing problems of practice in a researcher's local context, and findings are not necessarily meant to be generalizable, reflecting on implications can improve practice and benefit the field (Dawson & Kumar, 2014). The following section will discuss (a) personal implications, (b) recommendations for improving the applied practice experience tracking system in the local context, and (c) implications for future research.

Personal implications

An important component of professional degree programs, such as education doctorates focused on educational technology, is reflecting on how dissertation research can improve practice, inform decision making, and support professional growth of the student (Dawson & Kumar, 2014; Shulman, 2005). The applied research and focus on addressing problems in my local context have provided the opportunity for personal and professional growth. This section offers a reflection on (a) my research methods (b) theoretical frameworks used, and (c) growth as an educational technology professional.

Research Methods

Before starting the doctoral program, I was not aware of the action research approach and had not previously done mixed methods research. Action research provides

a framework for solving specific problems of practice through planning, acting, developing, and reflecting (Mertler, 2019). Those stages are often repeated in a cyclical fashion to continually evaluate, improve, and refine approaches and solutions to the problem being studied (Riel, 2023). My role as an educational technology professional has been to support faculty, students, and preceptors in identifying requirements, developing and testing technology systems to help them do their work, and improving systems as necessary. I have previously used project management techniques in my work, but I feel that learning about action research has provided me with a research-based approach that is more systematic and comprehensive.

Prior to starting my dissertation research, I had also not done mixed methods research. Mixed methods allow the researcher to integrate both qualitative and quantitative data for the purposes of triangulation, explanation of the data, and a richer understanding of the phenomena being studied (Creswell, 2014). The mixed methods approach has given me a different perspective on data collection and the types of data that are useful when examining problems of practice. I also appreciated that we identified a paradigm that matched both our worldview and research topic. Over the course of writing this dissertation, I feel like pragmatism and its focus on problem solving and "what works" (Creswell, 2014; Morgan, 2007) has provided a solid foundation for my research, has been well-aligned with my research questions, and has fit extremely well with the mixed methods approach.

Theoretical Frameworks Used

Another benefit of the dissertation process was the use of theoretical frameworks for the first time to guide my evaluation. Theoretical frameworks provide a scholarly

basis to make sense of data, give structure to arguments, and enable researchers to discuss their findings and results more clearly (Kivunja, 2018). Grant and Osanloo (2014) use the metaphor of building a house when writing a dissertation, with the theoretical framework serving as the blueprint that provides structure and defines how the researcher will "philosophically, epistemologically, methodologically, and analytically approach the dissertation as a whole" (pg. 13).

UTAUT served as an appropriate guiding theoretical framework, providing concepts and definitions, as well as establishing constructs that could be measured and analyzed using both quantitative and qualitative data sources. Examining participant perceptions using different constructs in a theoretical framework grounded in existing research was critical to organizing the study, making sense of the results, and structuring the resulting dissertation.

Growth as a Professional

Although I am not an educator in the traditional sense, I do consider myself an educational technology professional, and I feel that the doctoral program has served me well in a professional sense. I have worked at universities for my entire career, mainly in schools of public health. For the past 12 years, my primary focus has been to work with faculty, staff, and students to develop various web-based systems, including learning management systems, research databases, web-based assessments, and study recruitment websites.

Completing doctoral coursework and writing my dissertation has given me greater confidence when collaborating with faculty and students, as well as interacting with colleagues in the school of public health. That growth has been particularly evident as,

for example, I have helped to develop survey instruments, built and deployed intervention materials for research study participants, and designed various technology to deliver interventions for research study participants. I have served as the technology lead for each of those projects (and others) while completing my doctorate. Although this part of my professional growth is more difficult to quantify, I feel that the program has allowed me to "speak the language" and has given me a much better understanding of the problems I am helping to solve. It has also helped me to better understand the needs of the stakeholders with which I work in the university.

Recommendations for Improving the Applied Practice Experience Tracking System

This dissertation research will ultimately provide a roadmap for the school to improve and eventually replace the existing APE tracking and documentation system. While it does not necessarily provide specific insights into the building, implementing, and testing phases, it does capture what stakeholders like and do not like and how they perceive the current system. This section will summarize recommendations related to (a) taking a systematic approach, (b) ensuring proper training and support, (c) designing with workflow and flexibility in mind, and (d) addressing the needs of preceptors.

Systematic Approach

This dissertation research serves as a descriptive evaluation of MySPH as stakeholders use and perceive it at this point in time. It can be used to inform the next phase of development, which may include testing new features and building an initial prototype of the replacement system. Moving forward, a systematic plan for continuous design, development, evaluation, and refinement should be adopted to build new features and/or a new system. An educational technology development methodology should be

chosen for the next phases that is research-based, iterative, and driven by stakeholder input. The approach could draw from traditional project management techniques, instructional design models such as Analysis, Design, Development, Implementation, and Evaluation (ADDIE), and user-centered design and development practices (Budoya et al., 2019; Corry et al., 1997; Van Rooij, 2010). Regardless of the specific methods, the approach should be compatible with and informed by action research.

UTAUT could also serve as a theoretical framework when collecting and analyzing stakeholder feedback during each cycle of development and testing. For example, in the earlier phases, there could be a focus on performance expectancy (e.g., *what would make this system more useful for your work?*) and effort expectancy (e.g., *what would make it easier to use?*). Once that feedback has been incorporated, perhaps during a later testing phase, the evaluation can focus more on constructs such as facilitating conditions (e.g., *how would you like to be trained*? and *what would make you feel well-supported?*) and difficulty of use (e.g., *what do you find challenging?*). Measuring all constructs during the initial evaluation phase is important, but more focused evaluation and usability testing during each phase could help to keep stakeholder perceptions and needs at the forefront.

Proper Training and Support

One key finding of this research was that participants felt strongly about and had specific recommendations for improving training and support. Incorporating that feedback moving forward should be a priority. Compared with other recommendations, enhancing training and support can be accomplished without making major changes to the system or devoting programming resources. As participants noted, it could be as

simple as adding a FAQ, creating a few short videos, or ensuring that support channels are monitored more frequently.

Although participants had an overall positive perception of MySPH and reported that they found the site simple and relatively easy to use, attitude toward using the system was somewhat negative related to other constructs. Facilitating conditions have been shown to have both direct and indirect positive effects on user satisfaction of technology systems (Ambarwati et al., 2020; Teo & Wong, 2013; Wang et al., 2017). Ensuring that participants feel supported may also increase positive attitudes toward the system itself (Adam Mahmood et al., 2000). Even if participants do not feel that they personally need extensive training and support, minor improvements could be a low-cost way to address participant feedback in the short term and increase user satisfaction. An increased focus on training and support could also make them feel better equipped and more likely to use the system in the longer term.

Workflow and Flexibility

As attention turns to the actual development and build phases, application workflow and flexibility will be extremely important. Students, faculty, and preceptors have different expectations and use cases for the system, which must be accommodated during the planning and development phases. Undergraduate students tend to use the system to apply for practicum opportunities; graduate students use it to track the progress of their practicum; faculty need to be able to monitor and report; and preceptors use the system to manage practice opportunities and hire students. In addition, as participants noted both in survey and interview responses, the APE process can be unpredictable,

dates can shift, and plans for individual practice experiences may change. The need for specific functionality and features may also change over time.

For these reasons, a flexible, modular design with "evolvability" should be considered when developing new features or building the new system (Asan et al., 2004; Land, 1982). Evolvability is defined as the ability for a system to adapt to the changing technologies, operating systems, and needs of users over the course of its lifespan (Rowe et al., 1994). A system like MySPH, which has been in production for over 12 years, must therefore be built in such a way that it can evolve to meet future needs over the course of a long period of time. While it could be said that 12 years is an impressive lifespan for the current version of MySPH, it is no longer flexible enough to adapt to changing technology or the needs of users. Planning the system with an eye toward flexibility and future needs will be an important consideration moving forward.

Addressing the Needs of Preceptors

Finally, a focus on preceptor and other partner needs will also be important. As the limitations section will discuss, preceptors were somewhat underrepresented in the survey responses. Although students, and to a lesser extent, faculty, are the primary users of the system, preceptors are key collaborators in the APE process and the ones who ultimately provide opportunities for students.

It can be difficult to establish relationships and engage public health practitioners, and the demands of working as a public health professional while also mentoring students can be time-consuming and stressful (Burns et al., 2006; Dodge et al., 2014). In addition, many public health practitioners are overextended, especially at local and state level health departments, due to reduced staffing and funding (Leider et al., 2016). It is

therefore necessary to pay particular attention to their needs during each phase of the planning and development process. It should also be a priority to find ways to develop a system preceptors feel helps them do their work, is easy to use, and is well-supported by the school.

Implications for Future Research

All CEPH-accredited schools and programs of public health in the U.S. must provide sample artifacts and comprehensive documentation related to practice experiences as part of the accreditation process (Council on Education for Public Health, 2016). Examining factors related to making web-based tracking and documentation systems successful is thus an important part of achieving and maintaining accreditation. It is also relevant to all CEPH-accredited schools and programs in the U.S. This section will discuss implications for future research, including (a) expanding the study scope, and (b) improving attitudes toward the system.

Expanding the Study Scope

Due to the cost and time required to fully redevelop the system used within the school, it was not feasible to attempt a redesign during the course of the study. This research lays the foundation to evaluate a current system. If more time and resources are available, future research could look at other phases of the planning, acting, developing, and reflecting cycles to see if perceptions change over time. Constructs from UTAUT and UBS provide one option for evaluation, but other theoretical frameworks related to user satisfaction, collaborative design, and technology acceptance could be studied during implementation and testing. Pre- and post-tests could also be used to examine perceptions before and after changes are made to inform development. Collecting quantitative and

qualitative over multiple phases could help with stakeholder engagement and ensure that the end product meets their needs.

Improving Attitudes Toward the System

Examining which factors most contribute to positive attitudes about these types of system would also be a possible future direction for research. Given that measures of usefulness, ease-of-use, and facilitating conditions were all positive in the current study, the expectation would be that attitudes toward the system would be positive as well. Strong recommendations from users and descriptions of challenges they faced using MySPH do not necessarily offer a compelling explanation for why attitudes among participants were not better. Previous research suggests that perceived risk, social influence, trust, and motivation can all contribute to user attitudes toward technology (Elliott et al., 2012; Lee et al., 2003; Pan, 2020). An expanded study to examine specific contributors and strategies for improving attitudes could be a useful next step.

Limitations

There are inherent limitations in all research endeavors that must be acknowledged and reflected upon when considering directions for future research and opportunities for improved approaches (Greener, 2018). This section will discuss limitations to the current study including, (a) reliability of the survey instrument, (b) representation in the survey sample, and (c) time and scope limitations.

Reliability of the Survey Instrument

As noted in the quantitative data section, reliability of the survey instrument was one limitation. The survey was a mix of questions that drew constructs from both UTAUT and UBS. While all constructs have previously undergone extensive reliability

and validity testing (Garone et al., 2019; Suh et al., 2016; Wedlock & Trahan, 2019), the exact survey instrument used for this research had not previously been tested for reliability. Upon testing each survey construct for reliability, all fell in the acceptable range of .70 to .95, indicating that they were reliable measures (Tavakol & Dennick, 2011), except for facilitating conditions ($\alpha = .58$) and self-efficacy ($\alpha = .69$). Both of those constructs had alphas below the acceptable range. For future studies, if the survey is to be used again, those constructs should be examined to determine which questions should be added or removed to produce more reliable measures with acceptable alphas.

Representation in the Survey Sample

Representation in the survey sample was another limitation. There were a disproportionate number of student (n=61) survey responses compared to preceptors (n=8) and faculty (n=13). While students are the primary users of the system, and thus the demographics of the sample may be somewhat representative of the population, if the goal of the research is to make the system easier to use for all stakeholders, a greater focus on more preceptor and faculty users would be advisable for future research.

On reason for the more limited response rate of preceptors may be that they only use one component of the system (i.e., Opportunity Manager), while students use both APEX and Opportunity Manager. Faculty primarily use APEX or Opportunity Manager, but not usually both. Although the two components fulfill similar needs, they do have differences and the user population of each component may not necessarily overlap. Among survey responses, only eight respondents said that they used both components equally. Opportunity Manager also had more responses (n=56) than APEX (n=18). A larger sample size with greater representation of preceptors, faculty, and users of the

APEX system could allow the two components to be compared. That comparison would likely offer more insight into what MySPH users like and dislike about the individual components, rather than the overall system.

Time and Scope Limitations

Finally, time and scope challenges were another limitation to the research. This study was a descriptive evaluation of the current MySPH system rather than an intervention that tested a new implementation. Mertler (2021a) notes that one of the primary goals of action research is "to address local-level problems in practice with the anticipation of finding immediate answers to questions or solutions to those problems" (p. 1). While this study did provide some immediate answers and laid the foundation for improvements to the current system, it did not test implementing changes to ultimately solve the larger problem of replacing an outdated system. Give more time and resources, an implementation with a broader scope and multiple cycles of planning, acting, developing, and reflecting (Riel, 2023) could have produced a more comprehensive solution.

REFERENCES

Abdullah, F., & Ward, R. (2016). Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior*, *56*, 238–256. https://doi.org/10.1016/j.chb.2015.11.036

Abdullah, F., Ward, R., & Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-portfolios. *Computers in Human Behavior*, *63*, 75–90. https://doi.org/10.1016/j.chb.2016.05.014

Abramovich, S. (2016). Understanding digital badges in higher education through assessment. *On the Horizon*, *24*(1), 126–131. https://doi.org/10.1108/OTH-08-2015-0044/

Accreditation Statistics - Council on Education for Public Health. (n.d.). Retrieved November 9, 2022, from https://ceph.org/constituents/schools/faqs/general/accreditation-statistics/

Adam Mahmood, M., Burn, J. M., Gemoets, L. A., & Jacquez, C. (2000). Variables affecting information technology end-user satisfaction: a meta-analysis of the empirical literature. *International Journal of Human-Computer Studies*, *52*(4), 751–771. https://doi.org/10.1006/IJHC.1999.0353

Adams, K. A., Lawrence, E. K., & McGuire, E. K. (2018). *Research methods, statistics, and applications*. SAGE Publications.

Ain, N., Kaur, K., & Waheed, M. (2015). The influence of learning value on learning management system use: An extension of UTAUT2. *Information Development*, *32*(5), 1306–1321. https://doi.org/10.1177/0266666915597546

Ain, N., Kaur, K., & Waheed, M. (2016). The influence of learning value on learning management system use. *Information Development*, *32*(5), 1306–1321. https://doi.org/10.1177/0266666915597546

Akinde, O. A., Harr, D., & Burger, P. (2017). Field experience: Experiential learning as complementary to the conceptual learning for international students in a graduate teacher education program. *International Journal of Higher Education*, *6*(4), 137–151.

Alabdullah, J. H., Van Lunen, B. L., Claiborne, D. M., Daniel, S. J., Yen, C., & Gustin, T. S. (2020). Application of the unified theory of acceptance and use of technology model to predict dental students' behavioral intention to use teledentistry. *Journal of Dental Education*, *84*(11), 1262–1269. https://doi.org/10.1002/jdd.12304

Ambarwati, R., Harja, Y. D., & Thamrin, S. (2020). The role of facilitating conditions and user habits: a case of Indonesian online learning platform. *The Journal of Asian Finance, Economics and Business (JAFEB)*, *7*(10), 481–489.

Ameri, A., Khajouei, R., Ameri, A., & Jahani, Y. (2020). Acceptance of a mobile-based educational application (LabSafety) by pharmacy students: An application of the UTAUT2 model. *Education and Information Technologies*, *25*(1), 419–435. https://doi.org/10.1007/S10639-019-09965-5

Arnold School of Public Health. (2021). *Blueprint for academic excellence*. https://sc.edu/about/offices_and_divisions/provost/docs/blueprints/2021_asph.pdf

Arslan-Ari, I., Ari, F., Grant, M. M., & Morris, W. S. (2018). Action research experiences for scholarly practitioners in an online education doctorate program: Design, reality, and lessons learned. *TechTrends*, *62*(5), 441–449. https://doi.org/10.1007/s11528-018-0308-3

Asan, U., Polat, S., & Serdar, S. (2004). An integrated method for designing modular products. *Journal of Manufacturing Technology Management*, *15*(1), 29–49. https://doi.org/10.1108/09576060410512257/FULL/PDF

Asawa, P. (2009). Art Therapists' Emotional Reactions to the Demands of Technology. *Art Therapy*, *26*(2), 58–65. https://doi.org/10.1080/07421656.2009.10129743

Aziz, F., Mohd Rasdi, R., Md Rami, A., Razali, F., & Ahrari, S. (2022). Factors determining academics' behavioral intention and usage behavior towards online teaching technologies during COVID-19: An extension of the UTAUT. *International Journal of Emerging Technologies in Learning (IJET)*, *17*(09), 137–153. https://doi.org/10.3991/IJET.V17I09.30481

Bair, E., Niemer, R., Lee, C. J., & Anderson, O. S. (2019). Implementing ePortfolio tools within curricula: A guide for faculty. IDEA Paper# 78. *IDEA Center, Inc.*

Bandura, A. (1986). Social foundations of thought and action. *Englewood Cliffs, NJ*, *1986*(23–28).

Bandura, A. (1994). *Self-efficacy* (Vol. 4). New York.

Barnard, Y., Bradley, M. D., Hodgson, F., & Lloyd, A. D. (2013). Learning to use new technologies by older adults: Perceived difficulties, experimentation behaviour and usability. *Computers in Human Behavior*, *29*(4), 1715–1724. https://doi.org/10.1016/J.CHB.2013.02.006

Barrett, H. C. (1994). Technology-Supported Assessment Portfolios. *Computing Teacher*, *21*(6), 9–12.

Barrett, H. C. (1998). Strategic questions: What to consider when planning for electronic portfolios. *Learning & Leading with Technology*, *26*(2), 6–13.

Baukus, A. J. (2019). Developing a community-based research project proposal to build public health educator capacity: A graduate student perspective. *Health Promotion Practice*, *20*(6), 801–804. https://doi.org/10.1177/1524839919872748

Bolchini, D., & Paolini, P. (2002). Capturing web application requirements through goal-oriented analysis. *Anais Do WER02 - Workshop Em Engenharia de Requisitos, Valencia, Espanha, Novembro 11-12, 2002*, 16–28.

Bramley, A. L., Thomas, C. J., Mc Kenna, L., & Itsiopoulos, C. (2020). E-portfolios and Entrustable Professional Activities to support competency-based education in dietetics. *Nursing & Health Sciences*, *1*, nhs.12774. https://doi.org/10.1111/nhs.12774

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706QP063OA

Brave, S., & Nass, C. (2007). Emotion in human-computer interaction. In *The human-computer interaction handbook* (pp. 103–118). CRC Press.

Brown, S. A., Massey, A. P., Montoya-weiss, M. M., & Burkman, J. R. (2002). Do I really have to? User acceptance of mandated technology. *European Journal of Information Systems*, *11*(4), 283–295. https://doi.org/10.1057/palgrave.ejis.3000438

Budoya, C. M., Kissaka, M., & Mtebe, J. (2019). Instructional Design Enabled Agile

Method Using ADDIE Model and Feature Driven Development Process. *International Journal of Education and Development Using Information and Communication Technology*, *15*(1), 35–54.

Burns, C., Beauchesne, M., Ryan-Krause, P., & Sawin, K. (2006). Mastering the preceptor role: Challenges of clinical teaching. *Journal of Pediatric Health Care*, *20*(3), 172–183. https://doi.org/10.1016/J.PEDHC.2005.10.012

Buss, R. R., & Zambo, D. (2016). Using action research to develop educational leaders and researchers. *The EdD and the Scholarly Practitioner*, 137–152.

Calvo-Porral, C., Faíña-Medín, A., & Nieto-Mengotti, M. (2017). Exploring technology satisfaction: An approach through the flow experience. *Computers in Human Behavior*, *66*, 400–408. https://doi.org/10.1016/J.CHB.2016.10.008

Cantor, J. A. (1995). *Experiential learning in higher education: Linking classroom and community. ASHE-ERIC Higher Education Report No. 7.* ERIC Clearinghouse on Higher Education.

Carvalho, M., McCormick, L. C., Lloyd, L. M., Miner, K. R., & Alperin, M. (2017). Enhancing public health practice through a regional student field placement program. *Pedagogy in Health Promotion*, *3*(1_suppl), 73S-80S. https://doi.org/10.1177/2373379917697068

Chao, C. M. (2019). Factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT model. *Frontiers in Psychology*, *10*(JULY). https://doi.org/10.3389/FPSYG.2019.01652

Chapman, S., McPhee, P., & Proudman, B. (1992). What is experiential education? *Journal of Experiential Education*, *15*(2), 16–23.

Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. SAGE Publications.

Chen, M.-Y., Mou-Te Chang, F., Chen, C.-C., Huang, M.-J., & Chen, J.-W. (2012). Why do individuals use e-portfolios? *Journal of Educational Technology & Society*, *15*(4), 114–125.

Chengane, S., Cheney, A., Garth, S., & Medcalf, S. (2020). The COVID-19 response in Nebraska: How students answered the call. *Preventing Chronic Disease*, *17*. https://doi.org/10.5888/PCD17.200269

Cirelli, M. C., & Long, B. A. (2020). Doing Away with "Database:" Exploring Medical Library Website Design. *Journal of Electronic Resources in Medical Libraries*, *17*(3–4), 77–91. https://doi.org/10.1080/15424065.2020.1823291

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, *13*(1), 3–21.

Corry, M. D., Frick, T. W., & Hansen, L. (1997). User-centered design and usability testing of a web site: An illustrative case study. *Educational Technology Research and Development*, *45*(4), 65–76. https://doi.org/10.1007/BF02299683

Council on Education for Public Health. (2016). *Accreditation Criteria*. https://media.ceph.org/wp_assets/2016.Criteria.pdf

Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches*. SAGE Publications,.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. SAGE Publications.

Crowther, M. S., Keller, C. C., & Waddoups, G. L. (2004). Improving the quality and

effectiveness of computer-mediated instruction through usability evaluations. *British Journal of Educational Technology*, *35*(3), 289–303. https://doi.org/10.1111/J.0007-1013.2004.00390.X

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, *13*(3), 319–339. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982–1003. http://www.jstor.org/stable/2632151

Dawn, S., Smith, M. J., Peterson, S., Cone, C., Salazar, K., Bond, R., & Godwin, D. (2011). Electronic portfolios: Questions, implementation, and lessons learned in a doctor of pharmacy program. *Currents in Pharmacy Teaching and Learning*, *3*(3), 164–170. https://doi.org/10.1016/j.cptl.2011.04.009

Dawson, K., & Kumar, S. (2014). An analysis of professional practice Ed.D. dissertations in Educational Technology. *TechTrends*, *58*(4), 62–72. https://doi.org/10.1007/S11528-014-0770-5

De Geest, S., Dobbels, F., Schönfeld, S., Duerinckx, N., Sveinbjarnardottir, E. K., & Denhaerynck, K. (2013). Academic service partnerships: What do we learn from around the globe? A systematic literature review. *Nursing Outlook*, *61*(6), 447–457. https://doi.org/10.1016/J.OUTLOOK.2013.02.001

Delve. (n.d.). Retrieved September 15, 2022, from https://delvetool.com/

Dodge, T., Mazerolle, S. M., & Bowman, T. G. (2014). Challenges faced by preceptors serving in dual roles as health care providers and clinical educators. *Athletic*

Training Education Journal, *9*(1), 29–35. https://doi.org/10.4085/090129

Dulock, H. L. (1993). Research design: Descriptive research. *Journal of Pediatric Oncology Nursing*, *10*(4), 154–157.

Duman, S. N. (2021). Analysis of the postgraduate theses completed in the field of teacher education programs. *International Online Journal of Educational Sciences*, *13*(4). https://doi.org/10.15345/IOJES.2021.04.011

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, *21*(3), 719–734. https://doi.org/10.1007/s10796-017-9774-y

Eliot, K. A., Kolasa, K. M., & Cuff, P. A. (2018). Stress and burnout in nutrition and detetics: Strengthening interprofessional ties. *Nutrition Today*, *53*(2), 63–67. https://doi.org/10.1097/NT.0000000000000269

Elliott, K., Meng, G., & Hall, M. (2012). The influence of technology readiness on the evaluation of self-service technology attributes and resulting attitude toward technology usage. *Services Marketing Quarterly*, *33*(4), 311–329. https://doi.org/10.1080/15332969.2012.715049

Epstein, R. M., & Hundert, E. M. (2002). Defining and assessing professional competence. *JAMA*, *287*(2), 226–235. https://doi.org/10.1001/JAMA.287.2.226

Erwin, P. C., Barlow, P., Brownson, R. C., Amos, K., & Keck, C. W. (2016). Characteristics of Academic Health Departments: Initial findings from a cross-sectional survey. *Journal of Public Health Management and Practice*, *22*(2), 190–193. https://doi.org/10.1097/PHH.0000000000000237

Erwin, P. C., Harris, J., Wong, R., Plepys, C. M., & Brownson, R. C. (2016). From the schools and programs of public health: The academic health department: Academic–practice partnerships among accredited U.S. schools and programs of public health, 2015. *Public Health Reports*, *131*(4), 630–636. https://doi.org/10.1177/0033354916662223

Erwin, P. C., & Keck, C. W. (2014). The academic health department: The process of maturation. *Journal of Public Health Management and Practice*, *20*(3), 270–277. https://doi.org/10.1097/PHH.0000000000000016

Erwin, P. C., Parks, R. G., Mazzucca, S., Allen, P., Baker, E. A., Hu, H., Davis-Joyce, J., & Brownson, R. C. (2019). Evidence-based public health provided through local health departments: Importance of academic-practice partnerships. *American Journal of Public Health*, *109*(5), 739–747. https://doi.org/10.2105/AJPH.2019.304958

Fallowfield, S. M., Urtel, M., Swinford, R., Angermeier, L., & Plopper, A. S. (2019). A case study in EPortfolio implementation: A department-wide perspective. *International Journal of EPortfolio*, *9*(n2), 111–118.

Fang, X., Hu, P. J.-H., Chau, M., Hu, H.-F., Yang, Z., & Sheng, O. R. L. (2012). A data-driven approach to measure web site navigability. *Journal of Management Information Systems*, *29*(2), 173–212.

Farrell, O. (2020). From portafoglio to eportfolio: The evolution of portfolio in higher education. *Journal of Interactive Media in Education*, *2020*(1), 1–14. https://doi.org/10.5334/jime.574

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed

methods designs—Principles and practices. *Health Services Research*, *48*(6pt2), 2134–2156. https://doi.org/10.1111/1475-6773.12117

Fierke, K. K., Lepp, G. A., Maxwell, W. D., Hager, K. D., & Sucher, B. J. (2019). Improving advanced pharmacy practice experiences with an intention/reflection practice. *Currents in Pharmacy Teaching & Learning*, *11*(4), 394–401. https://doi.org/10.1016/J.CPTL.2019.01.002

Ganotice, F. A., & King, R. B. (2014). Social influences on students' academic engagement and science achievement. *Psychological Studies*, *59*(1), 30–35. https://doi.org/10.1007/S12646-013-0215-9/TABLES/2

Garone, A., Pynoo, B., Tondeur, J., Cocquyt, C., Vanslambrouck, S., Bruggeman, B., & Struyven, K. (2019). Clustering university teaching staff through UTAUT: Implications for the acceptance of a new learning management system. *British Journal of Educational Technology*, *50*(5), 2466–2483. http://dx.doi.org/10.1111/bjet.12867

Gediga, G., Hamborg, K.-C., Düntsch, I., È Nther Gediga, G., Hamborg, K., & È Ntsch, I. DU. (1999). The IsoMetrics usability inventory: An operationalization of ISO 9241-10 supporting summative and formative evaluation of software systems. *Behaviour & Information Technology*, *18*(3), 151–164. https://doi.org/10.1080/014492999119057

Ghalandari, K. (2012). The effect of performance expectancy, effort expectancy, social influence and facilitating conditions on acceptance of e-banking services in Iran: The moderating role of age and gender. *Middle-East Journal of Scientific Research*, *12*(6), 801–807.

Gibson, D., Ostashewski, N., Flintoff, K., Grant, S., & Knight, E. (2015). Digital badges in education. *Education and Information Technologies*, *20*(2), 403–410. https://doi.org/10.1007/S10639-013-9291-7

Goldstein, S. P., Thomas, J. G., Foster, G. D., Turner-McGrievy, G., Butryn, M. L., Herbert, J. D., Martin, G. J., & Forman, E. M. (2020). Refining an algorithm-powered just-in-time adaptive weight control intervention: A randomized controlled trial evaluating model performance and behavioral outcomes. *Health Informatics Journal*, *26*(4), 2315–2331. https://doi.org/10.1177/1460458220902330

Grant, C., & Osanloo, A. (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house." *Administrative Issues Journal*, *4*(2), 4.

Greece, J. A., DeJong, W., Gorenstein Schonfeld, J., Sun, M., & McGrath, D. (2019). Practice-Based teaching and public health training: Bringing real-world projects to the classroom to teach intervention planning and communication strategies. *Pedagogy in Health Promotion*, *5*(1), 55–61. https://doi.org/10.1177/2373379918760929

Greener, S. (2018). Research limitations: the need for honesty and common sense. *Interactive Learning Environments*, *26*(5), 567–568. https://doi.org/10.1080/10494820.2018.1486785

Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government organization in a developing country: An empirical study. *The Journal of Strategic Information Systems*, *17*(2), 140–154.

Habib, L., & Wittek, L. (2007). The portfolio as artifact and actor. *Mind, Culture, and*

Activity, *14*(4), 266–282. https://doi.org/10.1080/10749030701623763

Hall, D. L., Schonder, K. S., Pater, K. S., McGivney, M. S., & Meyer, S. M. (2016). *Using the Pharmacist Interaction Tracking Tool for capturing student-patient interactions in direct and simulated patient care activities*. *80*(6). https://doi.org/10.5688/AJPE806105

Hamilton, C. B., Buchanan, M. L., Grubaugh, J. H., & Erwin, P. C. (2014). Forming an academic health department: A case example. *Journal of Public Health Management and Practice*, *20*(3).

Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., McLeod, L., Delacqua, G., Delacqua, F., Kirby, J., & Duda, S. N. (2019). The REDCap consortium: Building an international community of software platform partners. *Journal of Biomedical Informatics*, *95*. https://doi.org/10.1016/J.JBI.2019.103208

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, *42*(2), 377–381.

Hartwig, K. A., Pham, M. K., & Anderson, E. (2004). Practice-based teaching and learning: An example of academic-community collaboration. *Public Health Reports*, *119*, 102–109.

Harver, A., Zuber, P. d., & Bastian, H. (2019). The capstone ePortfolio in an undergraduate public health program: Accreditation, assessment, and audience. *Frontiers in Public Health*, *7*(May), 31. https://doi.org/10.3389/fpubh.2019.00125

Hassenzahl, M. (2008). User experience (UX): Towards an experiential perspective on

product quality. *ACM International Conference Proceeding Series*, 11–15. https://doi.org/10.1145/1512714.1512717

Hays, D. G., Bolin, T., & Chen, C. C. (2019). Closing the gap: Fostering successful research-practice partnerships in counselor education. *Counselor Education and Supervision*, *58*(4), 278–292. https://doi.org/10.1002/CEAS.12157

Healey, M., & Jenkins, A. (2007). Kolb's Experiential Learning Theory and its application in geography in higher education. *Journal of Geography*, *99*(5), 185–195. https://doi.org/10.1080/00221340008978967

Hernandez, K. E., Bejarano, S., Reyes, F. J., Chavez, M., & Mata, H. (2014). Experience preferred: Insights from our newest public health professionals on how internships/practicums promote career development. *Health Promotion Practice*, *15*(1), 95–99. https://doi.org/10.1177/1524839913507578

Herr, K., & Anderson, G. L. (2014). *The action research dissertation: A guide for students and faculty*. SAGE Publications.

Hilliard, T. M., & Boulton, M. L. (2012). Public health workforce research in review: A 25-year retrospective. *American Journal of Preventive Medicine*, *42*(5), S17–S28. https://doi.org/10.1016/J.AMEPRE.2012.01.031

Hinch, B. K., Livesay, S., Stifter, J., & Brown, F. (2020). Academic-Practice partnerships: Building a sustainable model for doctor of nursing practice (DNP) projects. *Journal of Professional Nursing*, *36*(6), 569–578. https://doi.org/10.1016/j.profnurs.2020.08.008

Hong, J. I., Ng, J. D., Lederer, S., & Landay, J. A. (2004). Privacy risk models for designing privacy-sensitive ubiquitous computing systems. *DIS2004 - Designing*

Interactive Systems: Across the Spectrum, 91–100. https://doi.org/10.1145/1013115.1013129

Institute of Medicine. (1988). *The Future of Public Health*. National Academies Press (US). https://doi.org/10.17226/1091

ISO 9241-11:2018 - Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts. (2018). https://www.iso.org/standard/63500.html

Ivankova, N., & Wingo, N. (2018). Applying mixed methods in action research: Methodological potentials and advantages. *American Behavioral Scientist*, *62*(7), 978–997. https://doi.org/https://doi.org/10.1177/0002764218772673

Jarrett, J. B., Goliak, K. L., Haines, S. T., Trolli, E., & Schwartz, A. (2022). Development of an entrustment-supervision assessment tool for pharmacy experiential education using stakeholder focus groups. *American Journal of Pharmaceutical Education*, *86*(1), 15–20. https://doi.org/10.5688/AJPE8523

Jones, A. (2010). Affective issues in learning technologies: emotional responses to technology and technology's role in supporting socio-emotional skills. *Journal of Interactive Media in Education*, *2010*(2), 9. https://doi.org/10.5334/2010-9

Kang, K. C., Cohen, S. G., Hess, J. A., Novak, W. E., & Peterson, A. S. (1990). *Feature-Oriented Domain Analysis (FODA) Feasibility Study*. http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=11231

Kemper, K. A., Rainey Dye, C., Sherrill, W. W., & Mayo, R. M. (2004). Guidelines for public health practitioners serving as student preceptors. *Health Promotion Practice*, *5*(2), 160–173. https://doi.org/10.1177/1524839903258164

Kerwagen, F., Fuchs, K. F., Ullrich, M., Schulze, A., Straka, S., Krop, P., Latoschik, M.

E., Gilbert, F., Kunz, A., Fette, G., Störk, S., & Ertl, M. (2023). Usability of a mHealth Solution using speech recognition for point-of-care diagnostic management. *Journal of Medical Systems*, *47*(1), 1–10. https://doi.org/10.1007/S10916-022-01896-Y/TABLES/1

Khan, T., Nag, A. K., Joshi, B., Acharya, R., & Thomas, S. (2021). Influencing factors of behavior intention and actual use of technology: An application of UTAUT model on science undergraduates. *Journal of Higher Education Theory and Practice*, *21*(13), 89–103. https://doi.org/10.33423/JHETP.V21I13.4792

Khatun, F., Palas, M. J., & Ray, P. (2017). Using the Unified Theory of Acceptance and Use of Technology model to analyze cloud-based mHealth service for primary care. *Digital Medicine*, *3*(2), 69. https://doi.org/10.4103/DIGM.DIGM_21_17

Khechine, H., Lakhal, S., & Ndjambou, P. (2016). A meta-analysis of the UTAUT model: Eleven years later. *Canadian Journal of Administrative Sciences / Revue Canadienne Des Sciences de l'Administration*, *33*(2), 138–152. https://doi.org/10.1002/CJAS.1381

Khechine, H., Raymond, B., & Augier, M. (2020). The adoption of a social learning system: Intrinsic value in the UTAUT model. *British Journal of Educational Technology*, *51*(6), 2306–2325. https://doi.org/10.1111/BJET.12905

Kientz, J. A., & Suh, H. (2018). Understanding and Assessing the User Burden of Mobile Apps. *GetMobile: Mobile Computing and Communications*, *21*(4), 5–7. https://doi.org/10.1145/3191789.3191791

Kirakowski, J., & Corbett, M. (1990). *Effective Methodology for the Study of HCI*. Elsevier Science Inc.

Kivunja, C. (2018). Distinguishing between theory, theoretical framework, and conceptual cramework: A systematic review of lessons from the field. *International Journal of Higher Education*, *7*(6), 44–53. https://doi.org/10.5430/ijhe.v7n6p44

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT press.

Koo, D., & Miner, K. (2010). Outcome-Based workforce development and education in public health. *Annual Review of Public Health*, *31*(1), 253–269. https://doi.org/10.1146/annurev.publhealth.012809.103705

Kovach, K. A., Welter, C. R., Seweryn, S. M., & Torres, G. (2019). Perceived benefits of collaboration between local health departments and schools and programs of public health: A mixed-methods study. *Journal of Public Health Management and Practice*, *25*(2), 147–155. https://doi.org/10.1097/PHH.0000000000000823

Krisberg, K. (2017). New criteria for accreditation to chart updated course for public health education: Bolstering students. *The Nation's Health*, *46*(10).

Kuh, G. D., Gambino, L. M., Bresciani Ludvik, M., & O'Donnell, K. (2018). Using ePortfolio to document and deepen the impact of HIPs on learning dispositions. Occasional Paper# 32. *National Institute for Learning Outcomes Assessment*.

Kumar, S., Dawson, K., Pollard, R., & Jeter, G. (2022). Analyzing theories, conceptual frameworks, and research methods in EdD dissertations. *TechTrends*, *66*(4), 721–728. https://doi.org/10.1007/S11528-022-00739-4

Labissiere, Y. P., & Reynolds, C. (2004). Using electronic portfolios as a pedagogical practice to enhance student learning. *Inventio*, *2*(6).

Lakhal, S., Khechine, H., & Pascot, D. (2013). Student behavioural intentions to use

desktop video conferencing in a distance course: Integration of autonomy to the UTAUT model. *Journal of Computing in Higher Education*, *25*(2), 93–121. https://doi.org/10.1007/s12528-013-9069-3

Land, F. (1982). Adapting to changing user requirements. *Information & Management*, *5*(2), 59–75. https://doi.org/10.1016/0378-7206(82)90039-8

Lee. (2010). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation–confirmation model. *Computers & Education*, *54*(2), 506–516. https://doi.org/10.1016/J.COMPEDU.2009.09.002

Lee, J.-S., Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2003). Technology acceptance and social networking in distance learning. *Journal of Educational Technology & Society*, *6*(2), 50–61. http://www.jstor.org/stable/jeductechsoci.6.2.50%0A

Leider, J. P., Shah, G., Rider, N., Beck, A., Castrucci, B. C., Harris, J. K., Sellers, K., Varda, D., Ye, J., Erwin, P. C., & Brownson, R. C. (2016). Challenges and innovations in surveying the governmental public health workforce. In *American Journal of Public Health* (Vol. 106, Issue 11, pp. 1967–1974). American Public Health Association Inc. https://doi.org/10.2105/AJPH.2016.303424

Lewis, L. H., & Williams, C. J. (1994). Experiential learning: Past and present. *New Directions for Adult and Continuing Education*, *1994*(62), 5–16.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. SAGE Publications.

Lincoln, Y. S., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences. In *The SAGE handbook of qualitative research* (4th ed.). SAGE Publications.

Livingood, W. C., Goldhagen, J., Bryant, T., Wood, D., Winterbauer, N., & Woodhouse, L. D. (2007). A community-centered model of the academic health department and implications for assessment. *Journal of Public Health Management and Practice*, *13*(6), 662–669. https://doi.org/10.1097/01.PHH.0000296145.32789.9D

Lorenzo, G., & Ittelson, J. (2005). Demonstrating and assessing student learning with e-portfolios. *Educause Learning Initiative, ELI Paper*, *3*(2005), 19.

Lorenzo, G., Ittelson, J., & Oblinger, D. (2005). An overview of e-portfolios. *Educause Learning Initiative*, *1*(1), 1–27.

Lowe, D. (2003). Web system requirements: an overview. *Requirements Engineering 2003 8:2*, *8*(2), 102–113. https://doi.org/10.1007/S00766-002-0153-X

Mackenzie, N., & Knipe, S. (2006). Research dilemmas: Paradigms, methods and methodology. In *Issues in Educational Research* (Vol. 16, Issue 2).

Mahardika, H., Thomas, D., Ewing, M. T., & Japutra, A. (2019). Experience and facilitating conditions as impediments to consumers' new technology adoption. *The International Review of Retail, Distribution and Consumer Research*, *29*(1), 79–98. https://doi.org/10.1080/09593969.2018.1556181

Mallinson, D. J., & Burns, P. (2019). Increasing career confidence through a course in public service careers. *Journal of Political Science Education*, *15*(2), 161–178. https://doi.org/10.1080/15512169.2018.1443820

Malureanu, A., Panisoara, G., & Lazar, I. (2021). The relationship between self-confidence, self-efficacy, grit, usefulness, and ease of use of elearning platforms in corporate training during the covid-19 pandemic. *Sustainability (Switzerland)*, *13*(12), 6633. https://doi.org/10.3390/SU13126633/S1

Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: A systematic review. *Advances in Health Sciences Education*, *14*(4), 595–621. https://doi.org/10.1007/S10459-007-9090-2

Mata-Greve, F., Johnson, M., Pullmann, M. D., Friedman, E. C., Griffith Fillipo, I., Comtois, K. A., & Arean, P. (2021). Mental health and the perceived usability of digital mental health tools among essential workers and people unemployed due to COVID-19: Cross-sectional survey study. *JMIR Mental Health*, *8*(8), e28360. https://doi.org/10.2196/28360

McLeod, S. (2017). Kolb's learning styles and experiential learning cycle. *Simply Psychology*, *5*.

McWhorter, R. R., Delello, J. A., Roberts, P. B., Raisor, C. M., & Fowler, D. A. (2013). A cross-case analysis of the use of web-based ePortfolios in higher education. *Journal of Information Technology Education: Innovations in Practice*, *12*, 253–286.

Mead, T., & Pilla, D. (2017). Assessment of clinical and educational interventions that Advanced Pharmacy Practice Experience (APPE) students contributed to a family medicine residency program. *Currents in Pharmacy Teaching and Learning*, *9*(3), 460–467. https://doi.org/10.1016/j.cptl.2017.01.002

Meishar-Tal, H., & Levenberg, A. (2021). In times of trouble: Higher education lecturers' emotional reaction to online instruction during COVID-19 outbreak. *Education and Information Technologies*, *26*(6), 7145–7161. https://doi.org/10.1007/S10639-021-10569-1/TABLES/6

Merhi, M., Hone, K., & Tarhini, A. (2019). A cross-cultural study of the intention to use

mobile banking between Lebanese and British consumers: Extending UTAUT2 with security, privacy and trust. *Technology in Society*, *59*, 101151. https://doi.org/10.1016/J.TECHSOC.2019.101151

Merriam, S. (2009). *Qualitative Research: A Guide to Design and Implementation*. Centers for Teaching and Technology - Book Library.

Mertler, C. A. (2019). *Action research: Improving schools and empowering educators*. SAGE Publications.

Mertler, C. A. (2021a). Action research as teacher inquiry: A viable strategy for resolving problems of practice. *Practical Assessment, Research & Evaluation*, *26*, 19.

Mertler, C. A. (2021b). *Introduction to educational research*. SAGE Publications. https://books.google.com/books?id=IUD8DwAAQBAJ

Metzger, M. J. (2004). Privacy, trust, and disclosure: Exploring barriers to electronic commerce. *Journal of Computer-Mediated Communication*, *9*(4). https://doi.org/10.1111/J.1083-6101.2004.TB00292.X/4614483

Miles, M. B., Huberman, A. M., & Saldana, J. (2018). *Qualitative data analysis: A methods sourcebook*. SAGE Publications.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained. *Journal of Mixed Methods Research*, *1*(1), 48–76. https://doi.org/10.1177/2345678906292462

Morris, T. H. (2019). Experiential learning - a systematic review and revision of Kolb's model. *Interactive Learning Environments*, *28*(8), 1064–1077. https://doi.org/10.1080/10494820.2019.1570279

Naveh, G., & Shelef, A. (2021). Analyzing attitudes of students toward the use of technology for learning: simplicity is the key to successful implementation in higher

education. *International Journal of Educational Management*, *35*(2), 382–393. https://doi.org/10.1108/IJEM-04-2020-0204

Neil, E. R., Cailee, Welch Bacon, E., Nottingham, S. L., Kasamatsu, T. M., Lindsey, Eberman, E., Cailee, A., & Lindsey, A. (2019). Preceptors' frequency and supervision of athletic training students' medical documentation during clinical education. *Athletic Training Education Journal*, *14*(3), 182–190. https://doi.org/10.4085/1403182

Nierenberg, D. W., Eliassen, M. S., McAllister, S. B., Reid, B. P., Pipas, C. F., Young, W. W., & Ogrinc, G. S. (2007). A web-based system for students to document their experiences within six core competency domains during all clinical clerkships. *Academic Medicine*, *82*(1), 51–73. https://doi.org/10.1097/01.ACM.0000249990.86538.ac

Nolen, A., & Talbert, T. (2011). Qualitative assertions as prescriptive statements. *Educational Psychology Review*, *23*(2), 263–271. https://doi.org/10.1007/S10648-011-9159-6/METRICS

Nordhoff, S., Louw, T., Innamaa, S., Lehtonen, E., Beuster, A., Torrao, G., Bjorvatn, A., Kessel, T., Malin, F., Happee, R., & Merat, N. (2020). Using the UTAUT2 model to explain public acceptance of conditionally automated (L3) cars: A questionnaire study among 9,118 car drivers from eight European countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, *74*, 280–297. https://doi.org/https://doi.org/10.1016/j.trf.2020.07.015

Owens, O. L., Felder, T., Tavakoli, A. S., Revels, A. A., Friedman, D. B., Hughes-Halbert, C., & Hébert, J. R. (2019). Evaluation of a computer-based decision aid for

promoting informed prostate cancer screening decisions among african american men: iDecide. *American Journal of Health Promotion*, *33*(2), 267–278. https://doi.org/10.1177/0890117118786866

Oye, N. D., A.Iahad, N., & Ab.Rahim, N. (2014). The history of UTAUT model and its impact on ICT acceptance and usage by academicians. *Education and Information Technologies*, *19*(1), 251–270. https://doi.org/10.1007/S10639-012-9189-9

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, *42*(5), 533–544. https://doi.org/10.1007/s10488-013-0528-y

Pan, X. (2020). Technology acceptance, technological self-efficacy, and attitude toward technology-based self-directed learning: Learning motivation as a mediator. *Frontiers in Psychology*, *11*, 564294. https://doi.org/10.3389/FPSYG.2020.564294/BIBTEX

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Journal of Educational Technology & Society*, *12*(3), 150–162.

Park, S. Y., Nam, M.-W., & Cha, S.-B. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology*, *43*(4), 592–605. https://doi.org/https://doi.org/10.1111/j.1467-8535.2011.01229.x

Paulson, F. L., Paulson, P. R., & Meyer, C. A. (1991). What makes a portfolio a

portfolio? *Educational Leadership*, *48*(5), 60–63.

Paz, F., & Pow-Sang, J. A. (2016). A systematic mapping review of usability evaluation methods for software development process. *International Journal of Software Engineering and Its Applications*, *10*(1), 165–178.

Pittenger, A. L., Chapman, S. A., Frail, C. K., Moon, J. Y., Undeberg, M. R., & Orzoff, J. H. (2016). Entrustable professional activities for pharmacy practice. *American Journal of Pharmaceutical Education*, *80*(4). https://doi.org/10.5688/AJPE80457

Pittsley, K., & Memmott, S. (2012). Improving Independent Student Navigation of Complex Educational Web Sites: An Analysis of Two Navigation Design Changes in LibGuides. *University Library Faculty Scholarship*.

Powell, A., Freeman, T., & Kahn, S. (2019). *ePortfolio high-impact practice taxonomy*. https://scholarworks.iupui.edu/handle/1805/21503

Qualters, D. M. (2010). Bringing the outside in: Assessing experiential education. *New Directions for Teaching and Learning*, *2010*(124), 55–62. https://doi.org/10.1002/TL.421

Reynolds, C., & Shaquid Pirie, M. (2016). Creating an ePortfolio culture on campus through platform selection and implementation. *Peer Review*, *18*(3), 21–24.

Riel, M. (2023). *Understanding action research*. https://www.ccarweb.org/what-is-action-research

Roberts, J. (2018). From the editor: The possibilities and limitations of experiential learning research in higher education: *Journal of Experiential Education*, *41*(1), 3–7. https://doi.org/10.1177/1053825917751457

Roca, J. C., Chiu, C.-M., & Martínez, F. J. (2006). Understanding e-learning continuance

intention: An extension of the Technology Acceptance Model. *International Journal of Human-Computer Studies*, *64*(8), 683–696.

Rowe, D., Leaney, J., & Lowe, D. (1994). Defining systems evolvability-a taxonomy of change. *Change*, *94*, 541–545.

Saldaña, J. (2021). *The coding manual for qualitative researchers*. SAGE Publications Ltd.

Sastre-Fullana, P., De Pedro-Gómez, J. E., Bennasar-Veny, M., Serrano-Gallardo, P., & Morales-Asencio, J. M. (2014). Competency frameworks for advanced practice nursing: a literature review. *International Nursing Review*, *61*(4), 534–542. https://doi.org/10.1111/INR.12132

Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, *128*, 13–35. https://doi.org/10.1016/J.COMPEDU.2018.09.009

Shepherd, C. E., & Bolliger, D. U. (2011). The effects of electronic portfolio tools on online students' perceived support and cognitive load. *Internet and Higher Education*, *14*(3), 142–149. https://doi.org/10.1016/J.IHEDUC.2011.01.002

Shroff, R. H., Deneen, C. C., & Ng, E. M. W. (2011). Analysis of the technology acceptance model in examining students' behavioural intention to use an e-Portfolio system. *Australasian Journal of Educational Technology*, *27*(4), 600–618.

Shulman, L. S. (2005). Signature pedagogies in the professions. *Daedalus*, *134*(3), 52–59. http://www.jstor.org/stable/20027998

Siedlecki, S. L. (2020). Understanding descriptive research designs and methods. *Clinical*

Nurse Specialist, *34*(1), 8–12. https://doi.org/10.1097/NUR.0000000000000493

Smith, & Crocker, A. F. (2017). Experiential learning in physical therapy education. *Advances in Medical Education and Practice*, *8*, 427. https://doi.org/10.2147/AMEP.S140373

Smith, Waddell, L., Kyle, J., & Hand, G. (2014). Building a sustainable academic health department. *Journal of Public Health Management and Practice*, *20*(3), E6–E11. https://doi.org/10.1097/PHH.0b013e3182a2d9c2

Stefaniak, J. E. (2018). Performance technology. *Foundations of Learning and Instructional Design Technology*, 345–359. https://edtechbooks.org/lidtfoundations/performance_technology

Stefaniak, J. E. (2019). The utility of design thinking to promote systemic instructional design practices in the workplace. *TechTrends*, *64*(2), 202–210. https://doi.org/10.1007/s11528-019-00453-8

Steigerwald, D., Nolan, C., Loux, T., Baskin, C. R., & Scharff, D. P. (2016). Improving public health competencies through required practice experience. *Public Health*, *140*, 265–267. https://doi.org/10.1016/j.puhe.2016.07.001

Stevens, K. B. (2013). Contributing factors to a successful online course development process. *The Journal of Continuing Higher Education*, *61*(1), 2–11. https://doi.org/10.1080/07377363.2013.758554

Still, B., & Crane, K. (2017). *Fundamentals of user-centered design: A practical approach*. CRC press.

Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, *79*(2), 625–649.

https://doi.org/10.3102/0034654308325896

Suh, H., Shahriaree, N., Hekler, E. B., & Kientz, J. A. (2016). Developing and validating the user burden scale: A tool for assessing user burden in computing systems. *Conference on Human Factors in Computing Systems - Proceedings*, 3988–3999. https://doi.org/10.1145/2858036.2858448

Tan, G. W. H., Ooi, K. B., Chong, S. C., & Hew, T. S. (2014). NFC mobile credit card: The next frontier of mobile payment? *Telematics and Informatics*, *31*(2), 292–307. https://doi.org/10.1016/J.TELE.2013.06.002

Tao, Y. H., Cheng, C. J., & Sun, S. Y. (2009). What influences college students to continue using business simulation games? The Taiwan experience. *Computers & Education*, *53*(3), 929–939. https://doi.org/10.1016/J.COMPEDU.2009.05.009

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53. https://doi.org/10.5116/IJME.4DFB.8DFD

ten Cate, O. (2013). Nuts and bolts of entrustable professional activities. *Journal of Graduate Medical Education*, *5*(1), 157–158. https://doi.org/10.4300/JGME-D-12-00380.1

Teo, T., & Wong, S. L. (2013). Modeling key drivers of e-learning satisfaction among student teachers. *Journal of Educational Computing Research*, *48*(1), 71–95. https://doi.org/10.2190/EC.48.1.D

Tofade, T., Samimi-Gharai, M., & de Bittner, M. R. (2016). Strategies to grow an experiential learning program - The role of administrators. *Currents in Pharmacy Teaching and Learning*, *8*(3), 429–436. https://doi.org/10.1016/J.CPTL.2016.02.016

Tracy, S. J. (2019). *Qualitative research methods: Collecting evidence, crafting analysis,*

communicating impact. John Wiley & Sons.

Tsekleves, E., Whitham, R., Kondo, K., & Hill, A. (2011). Investigating media use and the television user experience in the home. *Entertainment Computing*, *2*(3), 151–161.

Turner-McGrievy, G. M., Yang, C.-H., Monroe, C., Pellegrini, C., & West, D. S. (2021). Is burden always bad? Emerging low-burden approaches to mobile dietary self-monitoring and the role burden plays with engagement. *Journal of Technology in Behavioral Science 2021 6:3*, *6*(3), 447–455. https://doi.org/10.1007/S41347-021-00203-9

Usability Testing. (n.d.). Usability.Gov. Retrieved January 11, 2024, from https://www.usability.gov/how-to-and-tools/methods/usability-testing.html

Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, *6*(5). https://doi.org/10.5430/jnep.v6n5p100

Van Rooij, S. W. (2010). Project management in instructional design: ADDIE is not enough. *British Journal of Educational Technology*, *41*(5), 852–864. https://doi.org/10.1111/j.1467-8535.2009.00982.x

Varda, D., Shoup, J. A., & Miller, S. (2012). A systematic review of collaboration and network research in the public affairs literature: Implications for public health practice and research. In *American Journal of Public Health* (Vol. 102, Issue 3, pp. 564–571). American Public Health Association. https://doi.org/10.2105/AJPH.2011.300286

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology

Acceptance Model: four longitudinal field studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/MNSC.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly: Management Information Systems*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, *36*(1), 157–178. https://doi.org/10.2307/41410412

Villanueva, A. M., Hovinga, M. E., & Cass, J. L. (2011). Master of Public Health community-based practicum. *Journal of Public Health Management and Practice*, *17*(4), 337–343. https://doi.org/10.1097/PHH.0b013e3182140c78

Vlachogianni, P., & Tselios, N. (2022). Perceived usability evaluation of educational technology using the System Usability Scale (SUS): A systematic review. *Journal of Research on Technology in Education*, *54*(3), 392–409. https://doi.org/10.1080/15391523.2020.1867938

Wang, C. S., Jeng, Y. L., & Huang, Y. M. (2017). What influences teachers to continue using cloud services?: The role of facilitating conditions and social influence. *Electronic Library*, *35*(3), 520–533. https://doi.org/10.1108/EL-02-2016-0046/FULL/PDF

Wedlock, B. C., & Trahan, M. P. (2019). Revisiting the Unified Theory of Acceptance and the Use of Technology (UTAUT) model and scale: An empirical evolution of educational technology. *Research Issues in Contemporary Education*, *4*(1), 6–20.

Wigington, C. J., Sobelson, R. K., Duncan, H. L., & Young, A. C. (2017). Service learning in public health: Exploring the benefit to host agencies in CDC's public health associate program. *Journal of Public Health Management and Practice*, *23*(5), 434–438. https://doi.org/10.1097/PHH.0000000000000523

Wilson, C. B., Slade, C., Kirby, M. M., Downer, T., Fisher, M. B., & Nuessler, S. (2018). Digital ethics and the use of ePortfolio: A scoping review of the literature. *International Journal of EPortfolio*, *8*(2), 115–125.

Wrye, B., Chafin, C., & Higginbotham, C. (2019). Creating a win-win: Designing and implementing mutually beneficial collaborations between community organizations and academic programs. In *Education and Training* (Vol. 61, Issue 5, pp. 605–621). Emerald Group Publishing Ltd. https://doi.org/10.1108/ET-01-2018-0011

Yancey, K. B. (2019). *ePortfolio as curriculum*. Sterling, VA: Stylus Publishing, LLC.

Young, S., Vos, S. S., Cantrell, M., & Shaw, R. (2014). Factors associated with students' perception of preceptor excellence. *American Journal of Pharmaceutical Education*, *78*(3). https://doi.org/10.5688/AJPE78353

APPENDIX A

SURVEY CONSENT

Thank you for considering participating in this study. My name is Matt McGrievy, and I am a doctoral candidate in the Educational Practice and Innovation program in the College of Education at the University of South Carolina. This research is being conducted as part of my doctoral degree requirements.

The purpose of this research is to evaluate the MySPH website (https://mysph.sc.edu) and make recommendations for how it might be improved. As a user of the MySPH website, you are being asked to complete this survey that will ask about your experiences using the system. The survey consists of 42 questions and should take about 10 minutes to complete.

Participation is completely voluntary. There will be no negative consequences if you choose not to participate or if you choose to withdraw at any point. In addition, responses are anonymous and no personal, identifiable information will be collected.

At the end of the survey, you will be asked if you are interested in participating in a follow-up interview. If you answer yes, you will be taken to a separate survey that will ask for your name and email address. Responses to each survey will be kept separate and there will be no way to connect your answers to your contact information.

As a thank you, you will be entered into a drawing for one of two $25 Amazon gift cards for completing the survey (odds of winning depend on the number of participants who complete the survey but are estimated at 1 in 40).

I am happy to answer any questions you may have about the study. Please feel free to contact me at mjm@sc.edu or my faculty advisor, Dr. William Morris at wsm@sc.edu, if you have any questions or would like more information.

Do you agree to participate in this study by completing the survey?

◯ Yes ◯ No

APPENDIX B

SURVEY INSTRUMENT

1. As a user of the MySPH system, my primary role is:
   Single choice.
   1, Student
   2, Public health practitioner
   3, Faculty
   4, Staff (e.g., undergraduate/graduate advisor, workforce development staff, etc.)
   5, Other
   If 5 is selected, then text box to fill in.
   If 1 is selected, then ask
      1a. Which degree program are you enrolled in?
      1, Undergraduate (BS or BA)
      2, Masters (MPH, MS, or MHA)
      3, Doctorate (PhD or DPT)

   If 1 or 3 is selected, then ask
      1b. What is your primary department or degree affiliation?
      1, Athletic Training
      2, Communications Sciences & Disorders
      3, Environmental Health Sciences
      4, Epidemiology and Biostatistics
      5, Exercise Science
      6, Health Promotion, Education, & Behavior
      7, Health Services Policy & Management
      8, Physical Therapy
      9, Public Health
      10, Other
      If 10 is selected, then text box to fill in.

2. What is your gender?
   Single choice.
   1, Male
   2, Female
   3, Non-binary

4, Transgender male
5, Transgender female
6, prefer not to say
7, prefer to self-describe below
If 7 is selected, then text box to fill in.

3. What is your age?
   1, 18-24 years old
   2, 25-34 years old
   3, 35-44 years old
   4, 45-54 years old
   5, 55-64 years old
   6, 65-74 years old
   7, over 75 years old

4. The component of MySPH that I use most often is:
   Single choice.
   1, Opportunity Manager
   2, APEX

5. When was the last time (approximately) you recall using <fill in response from question 4>?
   Date picker.

In the following questions, the "system" refers to <fill in response from question 4>. When answering the questions below, please consider your responses as they relate to <fill in response from question 4>.

7-point scale
1 – Strongly Agree, 2 – Moderately agree, 3 – Agree, 4 – Neutral, 5 – Moderately disagree, 7 – Strongly disagree

6. I find the system useful for my work/schoolwork.
7. Using the system enables me to accomplish practice-related tasks more quickly.
8. Using the system increases my productivity as a student, preceptor, or advisor.

9: *Practitioner*. If I use the system, I will increase my chances of finding good students to help with my work.
9: *Student*. If I use the system, I will increase my chances of finding a good internship, practicum, graduate assistantship, research opportunity, or other opportunity.

9: *Faculty*. If I use the system, I will increase my changes of find good placement opportunities or sites for my students.
10. Interactions with the system are clear and understandable.
11. I find the system easy to use.
12. Learning to use the system was easy for me.
13. It was easy for me to become skillful at using the system.
14. Using the system is a good idea.
15. The system makes work more interesting.
16. Working with the system is fun.
17. I like working with the system.
18: *Practitioner/Faculty*. My superiors at work think that I should use the system.
18: *Student*. My advisor or preceptor think that I should use the system.
19: *Practitioner/Faculty*. Colleagues at work think that I should use the system.
19: *Student*. Other faculty or students think I should use the system.
20: *Practitioner*. The senior leadership at my organization has been helpful in the use of the system
20: *Faculty/Student*. The senior leadership of this Arnold School has been helpful in the use of the system.
21. In general, the Arnold School has supported the use of the system.
22. I have the resources necessary to use the system.
23. I have the knowledge necessary to use the system.
24. The system is not compatible with other systems I use.
25. A specific person (or group) is available for assistance with system difficulties.
26. I could complete a task using the system...
    a) If there was no one around to tell me what to do as I go.
    b) If I could call someone for help if I got stuck.
    c) If I had a lot of time to complete the task assigned to me.
    d) If I had just the built-in help on the website for assistance.
27. I plan to use the system in the next 6 months.

5-point scale
0 – Never, 1 – A little bit of the time, 2 – Sometimes, 3 – Very often, 4 – All of the time
28. I need assistance from another person to use the system
29. The system demands too much mental effort
30. It takes too long for me to do what I want to do with the system
31. The system requires me to do a lot to maintain my privacy within it
32. The system requires me to remember too much information
33. The system presents too much information at once

5-point scale

0 – Not at all, 1 – A little bit, 2 – Somewhat, 3 – Very much, 4 - Extremely

34. The system is hard to learn
35. I am worried about what information gets shared by the system
36. The system's policies about privacy are not trustworthy

37. In thinking about <fill in response from question 4>, which features do you find *most valuable*?

38. Which features do you find *least valuable* or difficult to use?

39. What recommendations do you have that would help make the system easier to use?

40. What recommendations do you have for how training or on-going support could be improved?

41. Are there any other comments, suggestions, or other information you would like to share?

42. Would you be willing to take part in an approximately 30-minute follow-up interview?

If yes, text boxes for name and email address.

APPENDIX C

COMPARISON OF SURVEY QUESTIONS TO ORIGINAL INSTRUMENT QUESTIONS

Table C.1 UTAUT Survey Questions

Survey	**Original**	**Construct**
I find the system useful for my work/schoolwork.	I would find the system useful in my job	Performance Expectancy
Using the system enables me to accomplish practice-related tasks more quickly.	Using the system in my job would enable me to accomplish tasks more quickly.	
Using the system increases my productivity as a student, preceptor, or advisor.	Using the system in my job would increase my productivity.	
Practitioner. If I use the system, I will increase my chances of finding good students to help with my work.	If I use the system, I will increase my chances of obtaining a promotion.	
Student. If I use the system, I will increase my chances of finding a good internship, practicum, graduate assistantship, research opportunity, or other opportunity.		
Faculty. If I use the system, I will increase my changes of find good placement opportunities or sites for my students.		
Interactions with the system are clear and understandable.	My interaction with the system would be clear and	Effort Expectancy

	understandable.	
I find the system easy to use.	I would find the system easy to use.	
Learning to use the system was easy for me.	Learning to operate the system would be easy for me.	
It was easy for me to become skillful at using the system.	It would be easy for me to become skillful at using the system.	
Using the system is a good idea.	Using the system is a bad/good idea	Attitude toward using technology
The system makes work more interesting.	The system makes work more interesting.	
Working with the system is fun.	Working with the system is fun.	
I like working with the system.	I like working with the system.	
Practitioner/Faculty. My superiors at work think that I should use the system. *Student*. My advisor or preceptor think that I should use the system.	People who influence my behavior think that I should use the system.	Social Influence
Practitioner/Faculty. Colleagues at work think that I should use the system. *Student*. Other faculty or students think I should use the system.	People who are important to me think that I should use the system.	
Practitioner. The senior leadership at my organization has been helpful in the use of the system *Faculty/Student*. The senior leadership of this Arnold School has been helpful in the use of the system.	The senior management of this business has been helpful in the use of the system.	

In general, the Arnold School has supported the use of the system.	In general, the organization has supported the use of the system.	
I have the resources necessary to use the system.	I have the resources necessary to use the system.	Facilitating Conditions
I have the knowledge necessary to use the system.	I have the knowledge necessary to use the system.	
The system is not compatible with other systems I use.	The system is not compatible with other systems I use.	
A specific person (or group) is available for assistance with system difficulties.	A specific person (or group) is available for assistance with system difficulties.	
I could complete a task using the system... . If there was no one around to tell me what to do as I go. 2. If I could call someone for help if I got stuck. 3. If I had a lot of time to complete the task assigned to me. 4. If I had just the built-in help on the website for assistance.	I could complete a job or task using the system... 1. If there was no one around to tell me what to do as I go. 2. If I could call someone for help if I got stuck. 3. If I had a lot of time to complete the job for which the software was provided. 4. If I had just the built-in help facility for assistance.	Self-Efficacy
I plan to use the system in the next 6 months.	I plan to use the system in the next <n> months.	Behavioral Intention to Use
I need assistance from another person to use the system	I need assistance from another person to use [X].	Difficulty of use
The system demands too much mental effort	[X] demands too much mental effort.	
It takes too long for me to do what I want to do with the system	It takes too long for me to do what I want to do with [X].	
The system is hard to learn	[X] is hard to learn.	

UBS survey questions (Suh et al., 2016)		
The system requires me to do a lot to maintain my privacy within it	[X] requires me to do a lot to maintain my privacy within it.	Privacy Burden
I am worried about what information gets shared by the system	I am worried about what information gets shared by [X].	
The system's policies about privacy are not trustworthy	[X]'s policies about privacy are not trustworthy.	
The system requires me to remember too much information	[X] requires me to remember too much information.	Mental Burden
The system presents too much information at once	[X] presents too much information at once.	

APPENDIX D

INTERVIEW PROTOCOL AND SCRIPT

Hi and welcome. Thanks so much for agreeing to participate in this study. Our interview today should take about 30-45 minutes. Your responses will be kept confidential and will not be shared outside of the research study. Before we begin, let me review the purpose of the study and what we will be talking about today. The purpose of this research is to evaluate the current MySPH system and make recommendations for how it might be improved. As you know, MySPH is used by students, faculty, and preceptors to track and document applied practice experiences within the school, and we'll be talking about your experiences using it. It has two main components, Opportunity Manager and the Applied Practice Experience (APEX) tracking system. As you are answer the questions, please base your responses on the component that you most often use.

For our interview today, I'll be recording our conversation and taking notes to ensure accuracy. Also, you are in no way obligated to participate and you can stop the interview at any time. Do you have any questions about the study or what we'll be doing today? And before we begin, do you consent to participate?

Ok, let's start!

1. Which component of MySPH (Opportunity Manager or APEX) do you primarily use?

2. When was the last time you recall using MySPH?

3. How often have you used MySPH (approximately) in the last year?

4. When and why did you start using MySPH?

5. Tell me about how you use the system in your current role as a [student, faculty advisor, staff, or preceptor].

6. Are you required to use the system? If yes…

    a. By whom?

    b. Would you use the system if you were not required?

7. What do you like most about MySPH?

8. What do you like least?
9. Which features do you use most often?
    a. How do you feel about those features that you use regularly?
    b. How have these features helped you with your job or schoolwork?
10. In thinking about the current system, which features do you find difficult to use?
11. How did you learn to use MySPH for the first time?
    a. What are ways that training could be changed or improved?
12. Tell me about a time when you found it difficult to use the MySPH system.
    a. When you encounter an issue, what do you do?
    b. How has the school provided support to you when you found issues, if any?
    c. What are ways that on-going support could be changed or improved?
13. Overall, how comfortable are you using the system?
14. What are other potential areas for improvement that would help make the system easier to use?
    a. Which ones are critical to your work as a [student, faculty, preceptor]?
15. If you were designing a brand-new system, how would you want it to work?
16. What features do you wish the current system had that would help you in your work?

Thank you for your responses. Those are all the questions I have for today. To summarize, you said _____ about your perception and usage of MySPH. Additionally, you recommended _____ form improving MySPH. Is that correct? Is there anything we didn't cover or questions that I didn't ask that you would like to discuss?

Please feel free to contact me if any questions or any thoughts come up related to our conversation. Also, would it be ok to reach out if I need to ask any follow-up questions?

Thanks again for participating and enjoy the rest of your day!

APPENDIX E

UNIVERSITY OF SOUTH CAROLINA

OFFICE OF RESEARCH COMPLIANCE

INSTITUTIONAL REVIEW BOARD FOR HUMAN RESEARCH
DECLARATION of NOT RESEARCH

Matt McGrievy
Arnold School of Public Health
Department of Public Health
915 Greene Street, Suite 509
Columbia, SC 29208

Re: **Pro00125138**

Dear Mr. Matt McGrievy:

This is to certify that research study entitled ***Evaluating a Web-Based System for Tracking Public Health Practice Experiences: A Descriptive Research Study Examining User Perceptions, Challenges, And Recommendations for Technology Improvement*** was reviewed on **11/10/2022** by the Office of Research Compliance, which is an administrative office that supports the University of South Carolina Institutional Review Board (USC IRB). The Office of Research Compliance, on behalf of the Institutional Review Board, has determined that the referenced research study is not subject to the Protection of Human Subject Regulations in accordance with the Code of Federal Regulations 45 CFR 46 et. seq.

No further oversight by the USC IRB is required. However, the investigator should inform the Office of Research Compliance prior to making any substantive changes in the research methods, as this may alter the status of the project and require another review.

If you have questions, contact Lisa M. Johnson at lisaj@mailbox.sc.edu or (803) 777-6670.

Sincerely,

Lisa M. Johnson
ORC Assistant Director and IRB Manager