Understanding instructor adoption of social media using the technology acceptance model

Chulapol Thanomsing
Department of Public Health Sciences, Penn State College of Medicine, Hershey, Pennsylvania, USA, and
Priya Sharma
Department of Learning and Performance Systems, Penn State College of Education, University Park, Pennsylvania, USA

Abstract

Purpose – Social media are increasingly being used in teaching and learning in higher education. This paper aims to explore multiple case studies to better understand how instructors decide to incorporate social media into learning.

Design/methodology/approach – This qualitative case study used the technology acceptance model (TAM) to explore five instructors' use of social media for teaching and learning, particularly the pedagogical reasons and goals driving their use of social media. Participant interviews, course documentation and social media observation data were collected to answer the research questions.

Findings – Findings suggest that an instructor's social media knowledge and awareness of instructional goals are important for the use of social media in learning. Three pedagogical objectives of the use of social media were found across five participants: collaborative learning, dialog and discussion, and authentic learning.

Originality/value – Previous studies have explored potential pedagogical uses of social media tools, however studies that attempt to understand how and why instructors decide to use particular social media tools are underreported.

Keywords Case study, Social media, Technology acceptance model, Social media in learning, Teaching and learning with technology

Paper type Research paper

Using the technology acceptance model

In the past decade, social media has become a substantial and integral part of United States adults' everyday lives, and while social media technologies and tools have ebbed and waned, people continue to use social media consistently and widely (Brooke and Anderson, 2021). Social media have become prominent in education in elementary (Greenhow and Askari, 2017), higher education (Zachos *et al.*, 2018), and continuing and distance education venues (Mnkandla and Minnaar, 2017). Additionally, increasing evidence suggests that social media significantly impact professional development and connection opportunities for teachers at all levels (Robson, 2016) especially in the way academics connect (Chugh *et al.*, 2021) and publish their work to broader audiences in or outside their own disciplines (Carrigan, 2019).

There is also growing recognition of social media's potential ability to enhance learning (Gruzd *et al.*, 2018) and to be a useful communication tool between students and teachers

(Bartosik-Purgat *et al.*, 2017). However, faculty still express hesitation in adopting these media for teaching and learning (Manca, 2020) and tend to use social media for research and networking purposes, rather than education-focused purposes (Chugh *et al.*, 2021). A recent study found that the use of social media presented opportunities for three shifts in education: (1) moving away from institutional learning management systems (LMSs) as academics in the study found LMSs to be unreliable and of low utility, (2) enhancing pedagogy, and (3) changing attitudes toward the effects of social media in education (Vandeyar, 2020). Other research also supported the positive impact of social media for enhancing student communication (Zachos *et al.*, 2018) and for engaging students with their peers in collaboration and information sharing (Greenhow and Lewin, 2016). However, research has underscored educators' hesitancy to use social media for educational purposes (Willems *et al.*, 2018) partially due to cultural resistance, pedagogical or institutional barriers (Manca and Ranieri, 2016).

Teachers' beliefs about technology play a significant role in their use and adoption of technologies for teaching and learning (Tondeur *et al.*, 2017). The technology acceptance model (TAM) (Davis *et al.*, 1989) is a framework to understand and predict users' acceptance intention to a new technology. While TAM has been used to examine teachers' use of technology in general (Ranellucci *et al.*, 2020; Teo *et al.*, 2008), social media acceptance and adoption aspects were under-reported in literature (Al-Qaysi *et al.*, 2020). Using TAM as the framework, Dumpit and Fernandez (2017) examined students' use of social media technology and found TAM to be a robust predictor of student social media usage. Ajjan and Hartshorne's (2008) study on instructors' decisions to adopt Web 2.0 tools suggested that TAM could provide a clear picture of how instructors who are currently making use of social media perceived their use of such tools. The purpose of our study is to use the TAM framework to better understand pedagogical reasons and goals that could drive an instructor's use of social media. To accomplish this goal, we examined five unique cases of instructor's use of social media in teaching and learning in higher education.

Literature review
The use of social media for learning
Social media are prominently featured in practical and empirical discussions within education. Social media are broadly defined as "... interactive technologies that allow the creation or sharing/exchange of information, ideas, interests, and other forms of expression via virtual communities and networks" Wikipedia (2021), and include a broad range of technologies and tools. Based on our review, research on social media can be broadly classified into three key areas: (1) student perceptions of social media, (2) analysis of interactions within social media and (3) instructors' use of social media. Overall research suggests that students have positive perceptions of the use of social media for learning and examination of student interaction via social media indicates knowledge construction and collaboration benefits. However, the use of social media for these positive benefits might have been constrained by instructors' willingness to use and implement social media within their classrooms and understanding instructors' beliefs and rationales for using (or not) social media is an important direction of exploration.

Student perceptions of social media. Literature related to *student perceptions* focuses on students' feelings and perceptions about the use of social media for learning. Studies reported that students feel positively about the impact of social media on the learning environment, their cognitive skills and their interactions (Barun *et al.*, 2020; Daniels and Billingsley, 2014; Fosu *et al.*, 2019; Mondahl and Razmerita, 2014). For example, in Daniels and Billingsley's (2014) study, students perceived the class Facebook group as a helpful tool for communication and collaboration. More recently in a study by Barun *et al.* (2020), students

perceived the use of Google Suite as positive and as a useful tool for learning. In another study, students positively believed that the use of Twitter, in combination with the LMS, could be beneficial for learning and hoped for more integration of social media for teaching (Fosu *et al.*, 2019). Similarly, a survey of Arabic language students suggested that they perceive social media as improving language skills, making learning more interesting and changing their perspective on language learning (Sari and Hasibuan, 2019). Despite the many recent negative news items about the impact of social media use and considering the impact of the COVID-19 pandemic, students continue to perceive positive impacts of social media for learning. Undergraduate students highly and positively rated the use of Twitter for reflection, collaboration and communication (Abella-García *et al.*, 2019) and students perceived the use of various social media as very important for language learning (Lambton-Howard *et al.*, 2020). Students also reported positively on the use of YouTube for supporting learning (Maziriri *et al.*, 2020). However, some regional differences have also emerged. For example, a study on student perceptions of social media as a learning resource in China and the United States of America (USA) found that there were differences in perceptions of students in both countries and of students with or without previous experience using social media (Ma *et al.*, 2021). The study suggested that students in China are more positive about the use of social media than those in the USA. The study also found that students who have previously used social media responded more positively to the use of social media. In a study of using Twitter in education and communication classes, Luo and Xie (2019) found that while education students displayed a skeptical attitude towards the use of Twitter, communication students reported a more positive attitude.

Interactions within social media. Other studies have focused on *interactions* within social media. Studies used a mixed-method approach including self-reported data to analyze the effects of social media usage on students' interaction and collaboration. A review of Facebook usage in higher education points to its positive role for enhancing student engagement as well as student-student and student-teacher interactions (Chugh and Ruhi, 2018) and similarly medical students showed preferences for interacting and asking faculty questions on a closed Facebook discussion group (Henry *et al.*, 2020). Social media are also seen positively for facilitating student discussion and argumentation – for example in an English as a Foreign Language (EFL) class, the use of the social media messaging app, LINE, helped students to create concept maps to support organized and argumentative discussions and to make revisions quickly (Chang and Lu, 2018). Another study that analyzed messages on social media found potentially high engagement rates in Facebook and Twitter in an informal science learning project (Lundgren *et al.*, 2020). Social media have also been reported as positive for student engagement and creativity with graduate research training (Rasheed *et al.*, 2020) and to facilitate collaborative learning and engagement to accomplish research tasks (Al-Rahmi *et al.*, 2018).

Instructors' use of social media. While many studies have analyzed student perceptions and effects of social media in learning, fewer studies reported on *instructors' use of social media*. For example, Ajjan and Hartshorne (2008) found that while many instructors were aware of potential benefits of social media, a majority of them did not use it, and professional development was considered to be an important element for social media usage. Gruzd *et al.* (2018) used the uses and gratification framework to understand factors that influence instructors' decision making to use and sustain use of social media in teaching, and found that instructors used social media to expose students to social practices, extend the learning environment and promote learning through interaction and collaboration. However, the study did not explore how instructors specifically make use of social media in teaching.

Prestridge *et al.* (2019) focused on how instructors identified social media that could be of use and found that instructors' own personal networks and connections on social media were highly influential in their selection and use of tools, i.e. that they relied on the expertise of their peers and networks to make selections. Siyam (2019) used the TAM for exploring social

media use by special education teachers in United Arab Emirates (UAE) and found self-efficacy, time and access to technology to be factors that significantly impact teachers' use of technology. Our work builds on and extends these explorations by using TAM as the framework to understand how and why higher education instructors in the US choose to use social media to support learning within their classrooms.

Technology acceptance model

The TAM (Davis *et al.*, 1989) (see Figure 1) is an adaptation of Fishbein and Ajzen's (1975) theory of reasoned model (TRA). TAM was developed as a theoretical model to identify cognitive and affective determinants as fundamental variables of technology acceptance. According to TAM, an individual's behavior intention (BI) is a determinant of technology acceptance and usage (Actual Behavior). TAM suggests that behavioral intention is "jointly determined" by an individual's attitude toward using (A) which is then determined by the individual's perceived usefulness (PU) and perceived ease of use (PEoU). Thus, evidence of an individual's PU would be described by the extent to which users believe that the tools would help them accomplish specific tasks. Evidence for ease of use would be gauged by how users described ease of operating as well as learning to operate tools.

In the context of this study, PU was defined as how each instructor perceived personal, professional and pedagogical benefits of using social media in their teaching. For PEoU, instructors' acceptance of the use of social media can be determined by how easy or comfortable they feel it is to use and manage the tool. By examining both PU and PEoU, we can better explain factors that might influence instructors' decisions on the use of social media. We proposed studying the two constructs (U and EoU) within TAM as a theoretical model to help us explain how instructors accept and make decisions about the use of social media in learning.

Research questions and methods

The purpose of this study was to explore the reasons that drive instructors' use of social media in their teaching using the TAM framework. We explored this purpose through the lens of five unique cases of higher education instructors using social media in their classroom. This study aims to clarify potential motives, decision-making processes and strategies that led to social media adoption by instructors by using a case study research method. Case study research uses a variety of data sources, both quantitative and qualitative, to explore and build explanations of a specific phenomenon (Baxter *et al.*, 2008).

This research was conducted using a "holistic single-case study" approach (Yin, 2014). The focus of this study was to capture a clear set of circumstances (instructors' adoption of tools) within a specific context (social media in higher education teaching and learning). We primarily used multiple sources of qualitative evidence – documentation, interviews and observations – to examine each case. We were thus able to "collect a richer and stronger array of evidence" (Yin, 2014, p. 66), providing us with a better understanding of each instructor's perspective of social media usage in learning.
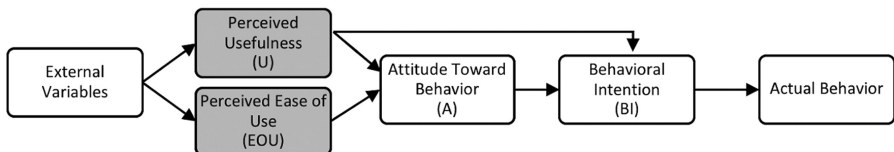

Figure 1.
The technology acceptable model (TAM)

Source(s): Davis *et al.*, 1989

Documentation
Documentation is perhaps the most relevant data for case studies (Yin, 2014) and can take many forms and formats. For this study, we considered existing course materials as documentary sources. Course materials included course syllabi, handouts, presentations and resources. These documents were used to "corroborate and augment evidence from other sources" (Yin, 2014, p. 107). Available documents were reviewed periodically throughout the period of the study to help corroborate, confirm or reject evidence found in the interviews.

Interviews
We conducted interviews following the guided interview approach (Rossman and Rallis, 2003; Yin, 2014). The open-ended interview questions focused on participants' acceptance, design, implementation and prior experience of social media in teaching. Two separate interview sessions were conducted. The first interview focused on the instructor's adoption, acceptance and experience of social media. The second interview was used as a follow-up session to corroborate and elaborate on the responses from the first interview as well as to seek clarification for data gathered from other sources. The interview sessions followed Yin's (2014) shorter case study interview format, lasting about an hour each. While the questions were open-ended, they were focused to avoid lengthy responses and were "carefully worded, . . .[to] appear genuinely naïve about the topic and allow the interviewee to provide a fresh commentary about it" (p. 111). The interview questions were designed to encourage participants to reveal their probability of PU and PEoU of social media usage in learning based on the TAM.

Unit of analysis
The unit of analysis in this study was an individual instructor who used a social media tool as part of their instructional strategies or learning activities during the spring 2018 semester at a large northeastern public university. The case study focused on five unique cases to establish an in-depth explanation of the instructors' use of social media. For the purpose of this study, we defined social media as any web application such as blogs, wikis, social networking sites (SNSs), multimedia sharing sites and virtual worlds including any institution-provided enterprise web application such as VoiceThread and Yammer, but excluding the institutional Learning Management System (LMS). The participants' experience with social media was not a criterion for selection, and case selection was based on a range of social media usage rather than best-case uses of social media.

Case participants
Initially, thirteen instructors were identified as candidates for this study and were invited to participate in a follow-up meeting. Based on follow up questions to establish their suitability for the study, five instructors were identified as potential candidates and agreed to participate in the study. Four participants were male and one was female, and social media tools used by participants were varied. Participants' teaching appointments, teaching experiences, experience with social media and course modality varied as illustrated in Table 1.

Data analysis
The goal of the analysis was to develop a clear explanation of how instructors chose to use social media in teaching using TAM as a framework. Therefore, we analyzed each instructor participant case to develop a deeper understanding of the use of social media in a learning environment.

The analysis was guided by Yin's explanation building approach (Yin, 2014). Yin (2014) noted that "To 'explain' a phenomenon is to stipulate a presumed set of causal links about it, or 'how' or 'why' something happened" (p. 147). The explanation building approach is iterative and requires a continual reexamination of the evidence in an attempt to provide clear explanations of each theme found in this study. We explored common themes of how instructor participants selected and used social media in their teaching. Some iterations of explanation building include (p. 149):

(1) Making an initial theoretical statement or an initial explanatory proposition

(2) Comparing the findings of *an initial case* against such a statement or proposition

(3) Revising the statement or proposition

(4) Comparing other details of the case against the revision

(5) Comparing the revision to the findings from *a second, third or more cases*

(6) Repeating this process as many times as needed

Making sense of the data collected in a qualitative study requires creative thinking, which "entails immersion, incubation, insight, and interpretation" (Rossman and Rallis, 2003, p. 279). To accomplish that, we followed Rossman and Rallis' (2003) 7-step generic analysis process. It is important to note that different phases did not occur in a linear sequence. We moved back and forth between phases depending on what was discovered in each phase.

(1) *Organizing the Data.* The data were strategically collected and organized by cases. Minor edits and validations were conducted to ensure the accuracy. The process was done immediately after data collection to ensure the accuracy.

(2) *Familiarizing Oneself with the Data.* Rossman and Rallis (2003) suggested that it is important that qualitative researchers spend time reviewing and revisiting the collected data. We transcribed, reviewed and cleaned up transcriptions to "provides leads for further data gathering, provokes insights, and stimulates analytic thinking" (p. 281).

(3) *Generating Categories and Themes.* This phase was equivalent to the "comparing the findings of an initial case against such a statement or proposition" step of Yin's (2014) iterative process of explanation building. For each case, we used the deductive analysis method which relies on codes that were established using preliminary categories. Through the ongoing reviews of the interviews, categories were added, combined and/or removed. Themes were established across cases after categories

Participant*	Craig	Henry	Kennedy	Malinda	Peter
Gender	Male	Male	Male	Female	Male
Appointment	Adjunct	Full-time Faculty	Full-time Faculty	Full-time Faculty	Full-time Faculty
Teaching experience	5 years	13 years	5 years	16 years	50 years
Field	Information Technology	Education	Education	Communication	Education
Level	Graduate	Graduate	Undergraduate	Undergraduate	Graduate
Delivery	Online	Online	Online	Online	Hybrid
Note(s): * Pseudonyms					

Table 1.
Participants'
demographics

were analyzed and reanalyzed. In this study, we used key categories from TAM including PU and PEoU.

(4) *Coding the Data*. We considered coding as the "revising the statement proposition" phase in Yin's (2014) explanation-building approach for a case study analysis. Coding was done in an iterative manner. Analyzing and reanalyzing categories produced new categories, organized codes generated, merged similar categories and removed unsupported categories. NVivo was used to code the data and identify themes for further analysis (see Figures 2 and 3).

(5) *Interpreting*. In this phase, we focused on synthesizing or finding meaning from the phenomenon and then building a story to express the phenomenon beyond the specifics of data, codes, revised categories and themes. To interpret the data, we used Rossman and Rallis' (2003) facilitating questions: what is going on here, what is the essence of the phenomenon, what is this phenomenon an example of, and what is the story these data tell. We began by reviewing other sources (course syllabi, materials, social media observations, etc.) to corroborate the evidence found in the interviews.

(6) *Searching for Alternative Understandings*. This phase resembles the "comparing the revision to the findings from other cases" process of Yin's (2014) explanation-building approach. We reviewed and compared the draft reports with other cases to allow us to confirm and challenge our interpretation of the cases.

(7) *Writing the Report*. The goal was for us to reveal the meaning discovered through the iterative process of the previous steps. Each case was analyzed, reanalyzed and compared with other cases. As a result, we were able to ensure the credibility of our case report.

Researcher positionality
Both authors are researchers and educators in the field of instructional technology. Our personal and professional interests motivate our work and contribution to the body of knowledge in the field. The first author is an experienced instructional designer who
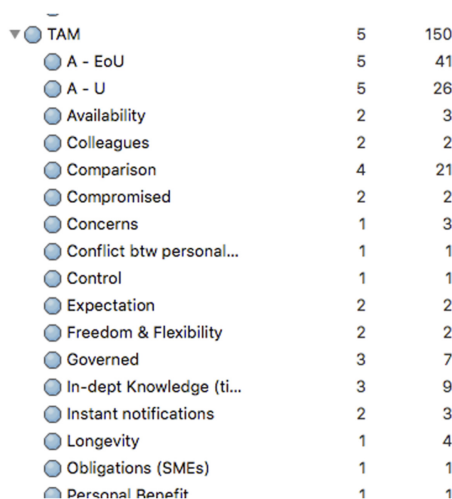

TAM	5	150
A - EoU	5	41
A - U	5	26
Availability	2	3
Colleagues	2	2
Comparison	4	21
Compromised	2	2
Concerns	1	3
Conflict btw personal...	1	1
Control	1	1
Expectation	2	2
Freedom & Flexibility	2	2
Governed	3	7
In-dept Knowledge (ti...	3	9
Instant notifications	2	3
Longevity	1	4
Obligations (SMEs)	1	1
Personal Benefit	1	1

Figure 2.
NVivo node counts
from 1st interview

0_TARM	0	0
A - EoU	9	64
+	8	41
Integration	3	6
Intuitive	7	25
Mobility	4	7
Track & Monitor	1	1
Variety Options	1	2
-	6	23
Exporting	1	1
Integration	2	10
Intuitive	6	12
A - U	9	73
Additional Discussions	10	37
Influences	11	117

routinely collaborates with various instructors to implement and use technology in teaching. The second author is a higher education faculty member who routinely uses social media in teaching and learning in higher education. Our combined experiences provided us with a suitable world view to examine, analyze and interpret the use of technology for teaching and learning. At the same time, by collaboratively discussing ideas and themes that emerged from the data and acknowledging our perspectives as a faculty user and/or instructional design practitioner allows us to remain neutral during the study.

Validity and reliability
Construct validity is the identification of the "correct operational measure for the concepts being studied" (Yin, 2014, p. 46). Yin (2014) suggested three tactics to increase validity while conducting case studies: the use of multiple sources of evidence, establishing a chain of evidence and reviewing a draft case report. To maintain validity, we collected different types of data which include documentation, instructor participants' interviews and observations.

Yin (2014) defined reliability as "the consistency and repeatability of the research procedures used in a case study" (p. 240). The objective of reliability is to ensure that a different researcher, if following the same procedures, "should arrive at the same findings and conclusions" (p. 48). Two recommended strategies to deal with reliability of the case study are to develop case study protocol when preparing to collect data and to maintain a chain of evidence during the data collection. We developed a data collection plan as a protocol. We created each participant's evidence in electronic format and organized each in an individual dataset in order to maintain a chain of evidence.

Findings
Each of the five instructor participants represented diverse cases of the use of social media. Definitions of social media are broad and include any web-based tool or application that allows individuals to engage in sharing and creating information within social networks – the broad understanding of this term is on display in the findings of this study. Each participant used different social media tools, ranging from popular, everyday tools like Twitter to more institutionally adopted tools. The level and time frames for integration of social media also varied across participants, based on their individual contexts and needs. Summaries of the individual case findings are first presented, followed by common themes emerging from instructors' PU and PEoU. All participant names are pseudonyms used to protect participant

confidentiality. We provide a detailed description of each participant's case (Stake, 1995) and their use of social media to provide important contextual background. This description allows us to emphasize the "proximal causes of behavior and the circumstances" (Bromley, 1991, p. 86) that surround specific actions and reasons for each case study, allowing us to contrast and compare these cases to arrive at more useful interpretations.

Participants' view on their use of social media
Case #1: Craig. Craig was an adjunct instructor who taught an online graduate introductory course in the Computer Sciences department. He taught this course for 5 years, teaching at least one section of approximately 15 students each semester. He used the VoiceThread web application in two of the assignments in the course. VoiceThread is "a media aggregator" (Eli, 2009) allowing users to collaborate and create multimedia presentations using different types of medium (videos, audios, annotations, etc.).

Craig was introduced to VoiceThread when the institution switched to a new LMS. Craig's goal in using the tool was to mediate student collaboration in creating multimedia-integrated projects. VoiceThread was used in two team-based research presentations. The assignments required students to collaborate to "create," "prepare" and "deliver" research-based presentations.

Referencing his own and his students' experience, Craig found VoiceThread to be easy to use for a new user. He mentioned that the tool was "[easy for] someone without much experience" and cited being able to easily create "a very basic crude sort of presentation" as some of the evidence for his perception. Craig viewed VoiceThread as a useful "mechanism" to mediate the development and delivery of team-based presentations.

Case #2: Henry. Henry was a full-time instructor in Education, with more than a decade of teaching experience in both secondary and postsecondary levels. Henry generally taught upper level courses. In this study, he uses Slack in a technology-oriented course. The course was an online graduate course and was offered once a year.

Henry switched from Yammer to Slack as an attempt to move away from a typical threaded conversation format: "[Yammer] was . . . more threaded than I want to have." He described Slack as a productive tool for workplace collaboration and communication. His goal for the use of Slack was to promote authentic interactions in online learning. In his course, he used Slack to communicate with students and asked them to use it for communication, weekly discussions and team collaboration.

Henry found Slack to be a "great mobile app" as "an important factor" for his decision. Henry viewed Slack as an easy-to-use tool because of its seamless integration which required minimal clicks to initiate other tools such as Google Hangout: "I tried to not make it so there's so much clicking. I really would like things to be as integrated and seamless as possible." The seamless integration of Slack with other collaborative add-ons (such as Google Hangout) was one of the key factors underlying Henry's PU of Slack. In addition, Henry found Slack to be a useful tool for providing authentic experience through the use of nonverbal communication icons. His perception involved his past experiences from witnessing how his students "would write thumbs up or a smiley face or they [students] would respond to a video or anything and in [LMS] I never get any of that."

Case #3: Kennedy. Kennedy was also a full-time instructor in Education with 5 years of teaching experience at various levels. During this study, he taught an undergraduate technology-oriented course. The course was offered every semester as part of a general education requirement. The course was regularly delivered in both face-to-face and online formats. Kennedy was assigned to teach both formats. At the time of this study, he used Flipgrid in his online course.

Kennedy learned about Flipgrid (an online video discussion platform) from his colleague and began using it shortly after. His goals were to find a tool that could provide students with

an opportunity to participate in discussion using different types of media. He used Flipgrid in three separate assignments that required students to submit their response in a video format: "It [Flipgrid] was a good tool and it's much, much, better than anything [In reference to previous tools, VoiceThread and YouSeeU]."

Kennedy's interest in the use of Flipgrid appears to be centered on its intuitiveness. He found Flipgrid to be easy to adopt as it allows students to choose any device to record videos and requires minimal learning curve to operate: "the student would not feel as though they needed some external training in order to know how to use the tool . . . you can use your cell phone you can use your iPad you can use a desktop computer . . . It was designed to be flexible and versatile." Kennedy believes Flipgrid is useful for providing students with varieties of learning experiences and facilitating communication and student engagement instead of using the traditional discussion boards: "[Flipgrid] creates some varieties and also it allows us to have the students participate in class using a medium other than just typing and text." In addition, Flipgrid's playback speed control appeared to be one of his preferred features of Flipgrid: "You can accelerate the speed of the video . . . I usually listen to it at one-half faster than normal."

Case #4: Malinda. Malinda was a full-time instructor in Communication, and had been teaching at the college level for 16 years. She spent 3 of those years teaching the current course, which was an online introductory, undergraduate course. The course is uniquely designed as a 7-week course and regularly offered during the first half of the Spring semester. She used Twitter in this course.

Malinda acknowledged the importance of Twitter (a social media platform that allows users to converse digitally using a limited number of characters) as an essential tool for marketing and advertising. Her driving force for using Twitter was to find ways to engage students. Malinda used Twitter for a synchronous discussion activity. Students were asked to participate in a real-time conversation with their classmates during the Super Bowl game, a very high-profile sporting event that occurs annually.

Through the use of the mobile app version of Twitter, she found that students could easily participate in live discussion with other students: "I just sit and watch super bowl with my phone and my thumbs . . . Twitter allows that flexibility because it's quick." Malinda's goal for the Super Bowl discussion was to capitalize on real-time conversations around new commercials played during the Super Bowl game. She perceived Twitter to be suitable and pedagogically appropriate for her course subject, especially for facilitating communication and advertising-related conversations: "there's an introduction to ads course we need to address that [live conversations] and so how better to do that in real time than to employ one of the social media platforms since by anecdotal but also marketplace researches right now are driving to Twitter."

Case #5: Peter. Peter, a full-time instructor in Education, had the longest teaching experience of all participants with about 50 years of teaching experience. In this study, we examined how Peter made use of Piazza in his graduate research-oriented course. At the time of the study, it was his 8th year of teaching the course and he began experimenting with Piazza after the first year of teaching this course.

Peter's use of Piazza was centered on finding ways to connect, collaborate and communicate with people from different locations. Piazza works as an online discussion platform where students are able to actively post and respond to questions that emerge in the community. Peter used Piazza as a primary method for asynchronous interactions and communication. There was clear evidence that Peter repeatedly emphasized expectations for the use of Piazza throughout the syllabus.

Peter cited the intuitiveness of Piazza, in comparison to other tools he had used, as a reason for his decision. In addition, Peter found the organization of messages and conversations in Piazza to be easy to use and navigate: "This is a familiar interface for a lot of people. This is

logging in, initiating a posting, responding to a posting, it's pretty straight forward and it very much looks like a webmail kind of interface." Two important characteristics that Peter appeared to find effective in Piazza were the immediacy and relevancy aspects of the content delivery. Peter's view of the immediacy could be found when he described his use of Piazza as a way to "push" messages to students immediately. Peter believed Piazza was useful because it gave him the ability to easily integrate various types of content (text or multimedia) into the class communication.

Main findings related to TAM
Our main findings center around two aspects of the technology acceptance model – instructor's PEoU and PU of the social media tools. Data analyses and coding revealed that both of these characteristics were mentioned often by participants but to differing degrees (see Tables 2 and 3). For example, Craig, Kennedy and Peter, mentioned EoU much more frequently than did Henry and Malinda, who in contrast mentioned PU more frequently. Different characteristics of the tools were cited by participants as leading to their perceptions of EoU or U. For example, intuitiveness and integration of the tool seemed to be primary factors in perceived EoU while the ability to facilitate communication gaps appeared to be primary in contributing to PU. We elaborate on these ideas further below.

Instructor's perceived ease of use (PEoU)
Intuitiveness. Intuitive user interface was a commonly mentioned theme by most of the instructor participants. Craig, Kennedy and Peter often emphasized intuitiveness of social

Codes	Transcripts	Explanations
PEoU > Intuitive	*It's [Piazza] very much that looks like a webmail kind of interface as it uses tags and you know I've had. this is not a foreign format,* (Peter)	Peter mentioning of webmail interface and "not a foreign format" was coded as the intuitiveness of the tool
PEoU > Mobility	*I just sit and watch super bowl with my phone and my thumbs . . ..student last year who what is a server at a local bar . . . the boss was actually very supportive he said that's a great idea.* (Malinda)	Malinda describing the ability for her student to participate in the assignment on the phone at work was coded as the mobility aspect of the tool
PU > Authenticity	*I would say the driving force is really seeking authentic forms of interaction amongst my students. It's part of my research and part of what I care mostly about, but I find learning management systems to be really inauthentic.* (Henry)	Henry's emphasis on "seeking authentic forms of interaction" when describing the driving force (to select the tool) was coded as the authenticity of the instructional activities
PU > Discussion	*I think that inclusion of video but not doing it too much in the class creates some variety and also it allows us to have the students participate in class using a medium other than just typing and text.* (Kennedy)	Kennedy's comment about the importance of using video and having it as an option for students to participate in class conversation was coded as the usefulness for discussions

Table 2. Example codes and explanations

Participant*	Craig	Henry	Kennedy	Malinda	Peter
PEoU	19	5	10	5	17
PU	8	22	2	18	13

Note(s): * Pseudonyms

Table 3. Number of instances for perceived ease of use (PEoU) and perceived usefulness (PU) found during the interviews

media as an important factor for choosing social media. They emphasized that social media tools should be user friendly and easy to use without much of a learning effort.

Kennedy and Craig described a user-friendly interface from the usability perspective as it required students to invest a minimal amount of effort to accomplish the required tasks. In the case of Flipgrid, Kennedy described its interface as easy-to-use requiring minimal effort and support. One of his reasons for choosing Flipgrid was because it was "intuitive so that the students would not feel as though they needed some external training." For Craig, the intuitiveness of VoiceThread appeared to be goal-specific. He emphasized how VoiceThread allowed students to easily complete specific tasks. Considering the goal of collaborative presentation creation, Craig found VoiceThread's interface to be simple for students to master: "They can quickly create content. They can quickly record their voice. They can quickly throw a diagram up."

On a different note, Henry and Peter described a user-friendly interface from the design perspective as having an appearance similar to that of other commonly used tools. As a result, they expected the tool to be easy enough to use so that students could easily familiarize themselves with the different features. Henry compared Slack's look and feel to that of a traditional online chat-room: "You can organize it into different channels, say for different projects or different ideas that you're working on, and it has a lot of similarities to an old-school chatroom." Similarly, Peter anticipated that Piazza should be easy to use because most people are already familiar with the Piazza protocol: "It's pretty straightforward. It very much looks like a webmail kind of interface . . . this is not a foreign format to most people."

Integration. Apart from *intuitiveness,* four instructor participants' PEoU can be found in their decision to use LMS-integrated tools. Social media is typically seen as a standalone tool outside of the LMS. For external system integration, the ability of a selected social media tool to integrate with additional tools and mobile technology was found to be an essential factor in selecting a social media tool.

Two types of integration were found in this study: enterprise application integration and external system integration. Three participants often discussed the importance of enterprise application integration. Craig's use of the word "provided resource" was an indication of the importance of system integration between LMS and VoiceThread when discussing his preference for using VoiceThread: "because it's [VoiceThread] a provided resource by the university." When asked about a potential alternative social media tool, Craig indicated a willingness to switch to another social media tool as long as it was integrated with the LMS: "If they [institution] were to provide such an [LMS integrated] tool, I would probably adopt it immediately." Craig's point of view regarding integration referred to system integration allowing users to seamlessly access a social media tool (VoiceThread) from the LMS without additional authentication or steps. Furthermore, the main focus of this type of integration is on allowing students to easily and, perhaps, seamlessly access a social media tool without much effort.

External system integration provided additional benefits and possibilities for utilizing social media tools. Henry described the importance of integration with other social media tools: "I try to make it like there is not much clicking. I really would like things to be as integrated and seamless as possible . . . you want to just have a quick Google hangout within Slack; you just type 'backslash hangout,' and you can automatically have face-to-face connections with people."

In addition, mobile technology integration was also mentioned by Malinda and Henry. Both appeared to consider this type of integration to be a factor for their decision to use social media. During the interviews, Malinda revealed her satisfaction with the Twitter mobile app when she recalled an event where one of her students was able to successfully participate in a live Twitter discussion using the Twitter app on their smart phone at work. Henry was pleased with how the Slack mobile app allowed students to easily and efficiently engage in

conversations and communication: "that's one of the really nice things about Slack is its mobile access and so people can do it anywhere at any time. I think it does foster quick bursts of communication."

Instructor's perceived usefulness (PU)
Facilitating communication gaps. Theory of transactional distance discusses the importance of addressing the challenge of separation between students and the instructor in distance education settings. Such separation is believed to "lead to communication gaps, a psychological space of potential misunderstandings between the behaviors of instructors and those of the learners" (Moore and Kearsley, 1996; Moore, 1997). The majority of the instructor participants in this study reported that the use of social media could help reduce communication gaps and establish presence in online learning.

In one example, Peter described how he used Piazza as a way to reach his students in a timely manner. Piazza gave him an opportunity to create teaching presence by integrating multimedia into his communication: "I can use audio, video, graphics and even some latex commands inside, so when I'm teaching the data analysis course if I want to show something with equations I can do it and it also provides me with summary." Kennedy also shared the same perspective. He found that the video discussion in Flipgrid provided students with the ability to communicate and interact with other students using richer media other than traditional texts. In another example, Henry discussed how his students used emoticons (for example, :-)) when they interacted in Slack. The use of emoticons in Slack could potentially help improve the social presence among students through class communication and interaction: "they would write thumbs up or a smiley face or they would respond to a video or anything and in [LMS] I never get any of that."

Another type of gap discussed was the ability of social media tools to simulate real-time and real-world communication. In Malinda's course, Twitter matched the need for real-world communication for her subject. Malinda found that the popularity of Twitter in advertisements allowed her students to connect to real-world conversations. The use of Twitter in Malinda's Super Bowl live discussion allowed her to provide students with opportunities to interact and to participate in real-world events, making learning more authentic and meaningful.

Discussion and implications
Our analyses indicated that PEoU and PU were both almost equally cited by instructors as a whole group as the reason for choosing social media tools. However, for some instructors, one of the factors played a more important role in their decision. For example, from Table 2, it is clear that for Henry and Malinda usefulness (PU) far outweighed considerations of ease of use (PEoU) – Henry mentioned utility 22 times vs only 5 times for ease of use. Thus, for Henry and Malinda, utility seemed to be the most important factor in making a decision while for others, ease of use was more important.

The importance of Instructor's first-hand social media experience
Most of the instructor participants in this study spent a considerable amount of time investigating and learning different tools before adopting it. Henry learned about Slack from reading a blog and investigated it on his own. "I had been reading a bit about it [Slack] and thought that it might be something worth looking into. The more I explored it the more I thought okay I think I can make this work." Similarly, Peter tried out different tools prior to choosing a tool that could potentially meet his instructional needs. "Sometimes I'll try those [different social media tools]. I'll read about them, come across them, and so I usually try a lot

of things out and then if they're promising I'll try to introduce them." It is unclear how much their knowledge and experience might have influenced their decision. It can, however, be an evidence of their commitment to as well as confidence in the use of social media tools. It is the commitment that makes the instructor's first-hand knowledge about tools essential for how they decide to make use of social media tools.

Having access to the tools allows instructors to have first-hand experience which, in turn, provides instructors in-depth knowledge of the social media tool and allows them to make sound decisions. In-depth knowledge allows instructors to determine the tools' usefulness and ease of use. This finding is consistent with other studies that confirmed that an instructor's knowledge about and access to tools could influence the use of tools. For example, Siyam (2019) found access to technology to positively impact the use of technology among special education teachers. Alsadoon (2018) found instructor's knowledge and experience of web applications to be a strong predictor to instructor's use of web applications. Similarly, a study by Izuagbe *et al.* (2019) of the effect of Information and Communication Technology (ICT) proficiency on library technology acceptance intention found e-skills to be the strongest determinant of technology acceptance. Relatedly, Edwards-Groves (2011) noted that students' use of social media in learning often relied on the teacher's knowledge about the tools. Based on this finding, institutions and design units in higher education should seek opportunities to provide instructors with support and training for learning and experimenting with social media tools, or indeed any emerging technologies. In addition, data from our research indicates that instructors should have clear purposes and instructional goals prior to the use of social media. This will allow them to determine the utility and power of social media tools to accomplish those goals. As also found in Izuagbe *et al.*'s (2019) study, when the users lack ICT proficiency, their PU can be a strong alternative determinant of technology acceptance.

Tradeoffs for perceived ease of use and usefulness

Based on the TAM, instructor participants most often cited PU and PEoU as most important in their selection of tools. This means that while instructors may have explored multiple tools, their selection of the tool is predicated on tools that they perceive to be intuitive, integrated, and that bridge communication gaps. Instructor participants mentioned concerns around privacy and student accessibility, and also discussed the institution's Family Educational Rights and Privacy Act (FERPA) and Americans with Disabilities Act (ADA) policies as a source of concern when deciding to use social media. Four out of five instructor participants in this study used what could be considered professional social media tools instead of popular social media tools due to these student concerns. The data suggest that although instructor participants had some reservations about the use of social media, the PU and ease of use of tools appeared to outweigh the concerns. This finding matches Alsadoon's (2018) study which showed that PU is a significant predictor of instructor's use of Web applications. While instructor perspectives are underreported, similar findings of factors influencing technology adoption can also be found from students' perspective. Yadegaridehkordi *et al.* (2019) found that students' PU of online collaborative learning tools can significantly affect their intention to adopt tools. While the current study sheds some light on factors contributing to instructor participants' adoption of social media, the process by which they come to a decision of adopting or not adopting is worth exploring. Such a question could help differentiate between adopters and nonadopters.

The analysis revealed important information about instructor participants' perceptions and pedagogical goals of the use of social media. This study found interactions to be a fundamental design element of the use of social media. The use of social media for interactions allows instructors to create "I-other" relationships (Kozulin, 1998) and to coordinate interpersonal, cultural-historical and individual influences on knowledge construction Schunk (2008). Previous studies supported our findings that social media has

potential to provide active interaction and collaborative learning. Ansari and Khan (2020) and Thoms and Eryilmaz (2014) found that the students' use of social media for collaborative learning results in the high degree of interaction and has a positive impact on knowledge sharing, and similarly Thoms and Eryilmaz (2014) showed that social media are more successful at positively impacting student experience and learning as compared to a LMS.

Implications for research and practice
While the TAM can offer a theoretical model to examine and explain the determinants of technology acceptance, it may not be able to provide an in-depth view of how instructors arrive at their decision on the adoption or rejection of social media. Liu *et al.* (2020) systematic review of learning technology adoption revealed the complexity of the individual adoption process which may be shaped by four themes; The Learning Technology, Academic Staff, Context and Influencing Adoption. The study also called for ways to address methodological issues.

Buchanan *et al.* (2007) suggest that the involvement of multiple actors led by change agents is the key to innovation. Rogers (1983) defined a *change agent* as "an individual who influences clients' innovation decisions in a direction deemed desirable by a change agency" (p. 312). Other studies recommend that instructors work collaboratively with educational support individuals such as instructional designers (Blouin *et al.*, 2009; Uys *et al.*, 2004). We suggest that instructional designers may act as change agents and can become an influencing factor in the use of social media in teaching and learning.

The results of our study suggest that, in practice, engaging instructors or instructional designers who may assist instructors in choosing appropriate social media tools for teaching and learning focuses on following four key guidelines.

(1) Social media implementation must be based on appropriate models/theories of interaction sought by the instructor.

(2) Instructors need to be experienced social media users and must be aware of the various tools available; in the absence of instructor experience, instructional designers can assist by gaining such knowledge, which may also help serve a broad population of diverse instructors.

(3) Instructors and/or instructional designers must actively participate in *testing and experimenting with* social media tools.

(4) Instructors and/or instructional designers must be *problem-solvers* when it comes to any institution's policies and guidelines, such as FERPA and ADA that may dictate social media use.

Limitations
This work and its outcome should be interpreted in light of the study limitations. One limitation is the pool of participants, which was small and skewed towards one discipline (Education) rather than including multiple. We sent out open invitations for participants and received few responses; thus recruitment relied heavily on faculty referrals which often led to participants from the same department or unit. Another limitation was the clear definition of the term social media. The term "social media" is evolving and can be broadly defined. Oxford dictionary defines social media as "websites and applications that enable users to create and share content or to participate in social networking." While this definition applies to a broad range of tools, social media is most commonly associated with platforms such as Facebook, Twitter, Google Drive, Youtube, Snapchat, Instagram, etc.

The varied understanding of this term might have limited the pool of participants – for example, instructors who used other user-generated content tools, also defined as social

media, might not have realized that they were potentially a qualified candidate for this study. At the same time, the broad usage of the term also sets up some conceptual difficulties in how to classify the tools used by the current study participants. This led to a pool with a wide range of social media tool usage, including some more popular general use tools such as Twitter and to more institutionally driven tools such as Piazza. While we acknowledge the diverse tools and usage by study participants, our goal was to shed light on individual instructor rationales for adopting these tools. Notwithstanding its limitations, since the goal of this study was exploring instructors' adoption of tools under the TAM, the findings of the study can still help researchers, designers, administrators and instructors themselves to understand and inform use and adoption of new tools for learning and teaching.

Conclusion

This case study aimed to provide descriptive and explanatory details regarding potential factors driving instructor participants' use of social media in their courses. The TAM was used to examine instructor participants' perceptions. Using a case study method (Yin, 2014), we selected five instructor participants, each representing a unique case of social media use in teaching.

Although each case was different, instructor participants shared some commonalities. Intuitiveness and integration were found to be key to their PEoU. Participants reported that the selected social media tools were easy to use to accomplish their goals and easy to integrate with other systems, expanding their potential usage. Bridging communication gaps was also a common theme related to PU . The majority of instructor participants reported that the use of social media could be useful for reducing communication gaps and establishing presences in online learning. Four out of five participants used a social media tool to encourage interaction, communication and collaboration.

This study has revealed the importance of instructors' knowledge of social media and awareness of their instructional goals. In particular, this study suggests that the goal of encouraging social interaction and instructors' commitment to learning about social media tools can lead to the adoption of social media in learning. Instructional designers and other instructional support personnel should serve as change agents to encourage and guide instructors in using social media to enhance student learning.

References

Abella-García, V., Delgado-Benito, V., Ausín-Villaverde, V. and Hortigüela-Alcalá, D. (2019), "To tweet or not to tweet: student perceptions of the use of Twitter on an undergraduate degree course", *Innovations in Education and Teaching International*, Vol. 56 No. 4, doi: 10.1080/14703297.2018. 1444503.

Ajjan, H. and Hartshorne, R. (2008), "Investigating faculty decisions to adopt Web 2.0 technologies: theory and empirical tests", *Internet and Higher Education*, Vol. 11 No. 2, doi: 10.1016/j.iheduc. 2008.05.002.

Al-Qaysi, N., Mohamad-Nordin, N. and Al-Emran, M. (2020), "A systematic review of social media acceptance from the perspective of educational and information systems theories and models", *Journal of Educational Computing Research*, Vol. 57 No. 8, doi: 10.1177/0735633118817879.

Al-Rahmi, W.M., Alias, N., Othman, M.S., Marin, V.I. and Tur, G. (2018), "A model of factors affecting learning performance through the use of social media in Malaysian higher education", *Computers and Education*, Vol. 121, doi: 10.1016/j.compedu.2018.02.010.

Alsadoon, E. (2018), "Motivating factors for faculty to use web applications in education", *Turkish Online Journal of Educational Technology - TOJET*, Vol. 17 No. 3, pp. 73-90.

Ansari, J.A.N. and Khan, N.A. (2020), "Exploring the role of social media in collaborative learning the new domain of learning", Springer, *Smart Learning Environments*, Vol. 7 No. 1, doi: 10.1186/s40561-020-00118-7.

Bartosik-Purgat, M., Filimon, N. and Kiygi-Calli, M. (2017), "Social media and higher education – an international perspective", *Economics and Sociology*, Vol. 10 No. 1, doi: 10.14254/2071-789X.2017/10-1/13.

Barun, A.N., Dauhiala, N.V., Dauhiala, D.A. and Dziatlau, U.U. (2020), "Peculiarities of using G suite for education services in the educational process of Polotsk state university", *Journal of Physics: Conference Series*, IOP Publishing, Vol. 1691, doi: 10.1088/1742-6596/1691/1/012161.

Baxter, P., Jack, S. and Jack, S. (2008), "Qualitative case study methodology: study design and implementation for novice researchers", *The Qualitative Report Volume*, Vol. 13 No. 4, doi: 10.2174/1874434600802010058.

Blouin, R.A., Riffee, W.H., Robinson, E.T., Beck, D.E., Green, C., Joyner, P.U., Persky, A.M. and Pollack, G.M. (2009), "Roles of innovation in education delivery", *American Journal of Pharmaceutical Education*, Vol. 73, doi: 10.5688/aj7308154.

Bromley, D.B. (1991), "Academic contributions to psychological counselling. 2. Discourse analysis and the formulation of case-reports", *Counselling Psychology Quarterly*, Vol. 4 No. 1, pp. 75-89.

Brooke, A. and Anderson, M. (2021), "Social media use in 2021", *Pew Research Center*, Vol. April 7, available at: https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2021/04/PI_2021.04.07_Social-Media-Use_FINAL.pdf.

Buchanan, D.A., Addicott, R., Fitzgerald, L., Ferlie, E. and Baeza, J.I. (2007), "Nobody in charge: distributed change agency in healthcare", *Human Relations*, Vol. 60 No. 7, doi: 10.1177/0018726707081158.

Carrigan, M. (2019), *Social Media for Academics*, 2nd ed, SAGE, Los Angeles, CA.

Chang, B. and Lu, F.C. (2018), "Social media facilitated English prewriting activity design and evaluation", *Asia-Pacific Education Researcher*, Springer Singapore, Vol. 27 No. 1, pp. 33-42.

Chugh, R. and Ruhi, U. (2018), "Social media in higher education: a literature review of Facebook", *Education and Information Technologies*, Vol. 23, pp. 605-616, doi: 10.1007/s10639-017-9621-2.

Chugh, R., Grose, R. and Macht, S.A. (2021), "Social media usage by higher education academics: a scoping review of the literature", *Education and Information Technologies*, Springer, Vol. 26 No. 1, pp. 983-999.

Daniels, K.N. and Billingsley, K. (2014), "Facebook'- it's not just for pictures anymore: the impact of social media on cooperative learning", *I-Manager's Journal of Educational Technology*, Vol. 11 No. 3, pp. 34-44, doi: 10.26634/jet.11.3.3008.

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989), "User acceptance of computer technology a comparison of two theoretical models", *Management Science*, Vol. 33 No. 8, pp. 982-1003.

Dumpit, D.Z. and Fernandez, C.J. (2017), "Analysis of the use of social media in Higher Education Institutions (HEIs) using the Technology Acceptance Model", *International Journal of Educational Technology in Higher Education*, Vol. 14 No. 1, doi: 10.1186/s41239-017-0045-2.

Edwards-Groves, C.J. (2011), "The multimodal writing process: changing practices in contemporary classrooms", *Language and Education*, Vol. 25 No. 1, doi: 10.1080/09500782.2010.523468.

Eli (2009), "Seven things you should know about VoiceThread", available at: www.educause.edu/eli

Fishbein, M. and Ajzen, I. (1975), *Chapter 1. Belief, Attitude, Intention, and Behavior: an Introduction to Theory and Research*, Addison-Wesley, Reading, MA.

Fosu, M.A., Gupta, T. and Michael, S. (2019), "Social media in chemistry: using a learning management system and twitter to improve student perceptions and performance in chemistry", *ACS Symposium Series*, Vol. 1318, doi: 10.1021/bk-2019-1318.ch013.

Greenhow, C. and Askari, E. (2017), "Learning and teaching with social network sites: a decade of research in K-12 related education", *Education and Information Technologies*, Springer New York LLC, Vol. 22 No. 2, pp. 623-645.

Greenhow, C. and Lewin, C. (2016), "Social media and education: reconceptualizing the boundaries of formal and informal learning", *Learning, Media and Technology*, Vol. 41 No. 1, pp. 6-30, Routledge.

Gruzd, A., Haythornthwaite, C., Paulin, D., Gilbert, S. and del Valle, M.E. (2018), "Uses and Gratifications factors for social media use in teaching: instructors' perspectives", *New Media and Society*, Vol. 20 No. 2, doi: 10.1177/1461444816662933.

Henry, D.S., Wessinger, W.D., Meena, N.K., Payakachat, N., Gardner, J.M. and Rhee, S.W. (2020), "Using a Facebook group to facilitate faculty-student interactions during preclinical medical education: a retrospective survey analysis", *BMC Medical Education*, Vol. 20 No. 1, doi: 10.1186/s12909-020-02003-w.

Izuagbe, R., Ibrahim, N.A., Ogiamien, L.O., Olawoyin, O.R., Nwokeoma, N.M., Ilo, P.I. and Osayande, O. (2019), "Effect of perceived ease of use on librarians' e-skills: basis for library technology acceptance intention", *Library and Information Science Research*, Vol. 41 No. 3, doi: 10.1016/j.lisr.2019.100969.

Kozulin, A. (1998), *Psychological Tools: A Sociocultural Approach to Education*, Harvard University Press, Cambridge.

Lambton-Howard, D., Kiaer, J. and Kharrufa, A. (2020), "'Social media is their space': student and teacher use and perception of features of social media in language education", *Behaviour and Information Technology*, Vol. 40 No. 16, pp. 1700-1715, doi: 10.1080/0144929X.2020.1774653.

Liu, Q., Geertshuis, S. and Grainger, R. (2020), "Understanding academics' adoption of learning technologies: a systematic review", *Computers and Education*, Vol. 151, doi: 10.1016/j.compedu.2020.103857.

Lundgren, L., Crippen, K.J. and Bex, R.T. (2020), "Social media interaction as informal science learning: a comparison of message design in two niches", *Research in Science Education*, Springer. doi: 10.1007/s11165-019-09911-y.

Luo, T. and Xie, Q. (2019), "Using Twitter as a pedagogical tool in two classrooms: a comparative case study between an education and a communication class", *Journal of Computing in Higher Education*, Springer New York LLC, Vol. 31 No. 1, pp. 81-104.

Ma, S., Knezek, G. and Spector, J.M. (2021), "University Student Perceptions of Social Media as a Learning Resource in China and the U.S.A", *TechTrends*, Vol. 65 No. 4, pp. 524-534.

Manca, S. (2020), "Snapping, pinning, liking or texting: investigating social media in higher education beyond Facebook", *Internet and Higher Education*, Elsevier, Vol. 44, doi: 10.1016/j.iheduc.2019.100707.

Manca, S. and Ranieri, M. (2016), "Facebook and the others. Potentials and obstacles of Social Media for teaching in higher education", *Computers and Education*, Elsevier, Vol. 95, pp. 216-230.

Maziriri, E.T., Gapa, P. and Chuchu, T. (2020), "Student perceptions towards the use of youtube as an educational tool for learning and tutorials", *International Journal of Instruction*, Vol. 13 No. 2, doi: 10.29333/iji.2020.1329a.

Mnkandla, E. and Minnaar, A. (2017), "The use of social media in E-Learning: a metasynthesis", *International Review of Research in Open and Distance Learning*, Athabasca University, Vol. 18 No. 5, pp. 227-248.

Mondahl, M. and Razmerita, L. (2014), "Social media, collaboration and social learning - A case-study of foreign language learning", *Electronic Journal of E-Learning*, Vol. 12 No. 4, pp. 339-352.

Moore, M.G. (1997), "Theory of transactional distance", *Distance Education*, Vol. 2, p. 351.

Moore, M. and Kearsley, G. (1996), *Distance Education: A Systems View*, Wadsworth, Belmont.

Prestridge, S., Tondeur, J. and Ottenbreit-Leftwich, A.T. (2019), "Insights from ICT-expert teachers about the design of educational practice: the learning opportunities of social media", *Technology, Pedagogy and Education*, Vol. 28 No. 2, doi: 10.1080/1475939X.2019.1578685.

Ranellucci, J., Rosenberg, J.M. and Poitras, E.G. (2020), "Exploring pre-service teachers' use of technology: the technology acceptance model and expectancy–value theory", *Journal of Computer Assisted Learning*, Vol. 36 No. 6, doi: 10.1111/jcal.12459.

Rasheed, M.I., Malik, J., Pitafi, A.H., Iqbal, J., Anser, M.K. and Abbas, M. (2020), "Usage of social media, student engagement, and creativity: the role of knowledge sharing behavior and cyberbullying", *Computers and Education*, Vol. 159, doi: 10.1016/j.compedu.2020.104002.

Robson, J. (2016), "Engagement in structured social space: an investigation of teachers' online peer-to-peer interaction", *Learning, Media and Technology*, Routledge, Vol. 41 No. 1, pp. 119-139.

Rogers, E.M. (1983), "Diffusion of Innovations", *An Integrated Approach to Communication Theory and Research*, 3rd ed.

Rossman, G.G. and Rallis, S.F. (2003), *Learning in the Field: an Introduction to Qualitative Research*, Sage Publications, Oaks, CA.

Sari, R.R. and Hasibuan, A.A. (2019), "Students' Perception toward Social Media Assisted Language Learning (SMALL) for Arabic Learning", *Izdihar: Journal of Arabic Language Teaching, Linguistics, and Literature*, Universitas Muhammadiyah Malang, Vol. 2 No. 2, p. 101.

Schunk, D. (2008), *Learning Theories: An Educational Perspective*, Mirrill/Prentice.

Siyam, N. (2019), "Factors impacting special education teachers' acceptance and actual use of technology", *Education and Information Technologies*, Vol. 24 No. 3, doi: 10.1007/s10639-018-09859-y.

Stake, R.E. (1995), *The Art of Case Study Research*, Sage Publications, Thousand Oaks, CA.

Teo, T., Lee, C.B. and Chai, C.S. (2008), "Understanding pre-service teachers' computer attitudes: applying and extending the technology acceptance model", *Journal of Computer Assisted Learning*, Vol. 24 No. 2, doi: 10.1111/j.1365-2729.2007.00247.x.

Thoms, B. and Eryilmaz, E. (2014), "How media choice affects learner interactions in distance learning classes", *Computers and Education*, Vol. 75, doi: 10.1016/j.compedu.2014.02.002.

Tondeur, J., van Braak, J., Ertmer, P.A. and Ottenbreit-Leftwich, A. (2017), "Understanding the relationship between teachers' pedagogical beliefs and technology use in education: a systematic review of qualitative evidence", *Educational Technology Research and Development*, Vol. 65 No. 3, doi: 10.1007/s11423-016-9481-2.

Uys, P.M., Nleya, P. and Molelu, G.B. (2004), "Technological innovation and management strategies for higher education in Africa: harmonizing reality and idealism", *Educational Media International*, Vol. 41 No. 1, doi: 10.1080/0952398032000105120.

Vandeyar, T. (2020), "The academic turn: social media in higher education", *Education and Information Technologies*, Springer, Vol. 25 No. 6, pp. 5617-5635.

Wikipedia (2021), *Social Media*, available at: https://en.wikipedia.org/wiki/Social_media

Willems, J., Adachi, C., Bussey, F., Doherty, I. and Huijser, H. (2018), "Debating the use of social media in higher education in Australasia: where are we now?", *Australasian Journal of Educational Technology*, Vol. 34 No. 5, doi: 10.14742/ajet.3843.

Yadegaridehkordi, E., Shuib, L., Nilashi, M. and Asadi, S. (2019), "Decision to adopt online collaborative learning tools in higher education: a case of top Malaysian universities", *Education and Information Technologies*, Vol. 24 No. 1, doi: 10.1007/s10639-018-9761-z.

Yin, R.K. (2014), *Case Study Research: Design and Methods*, 5th ed., SAGE Publications, Thousand Oaks, CA.

Zachos, G., Paraskevopoulou-Kollia, E.A. and Anagnostopoulos, I. (2018), "Social media use in higher education: a review", *Education Sciences*, Vol. 8 No. 4, doi: 10.3390/educsci8040194.

Corresponding author
Chulapol Thanomsing can be contacted at: czt128@psu.edu