



Applying Attributes of Contemplative Technopedagogy to a Social Media Assignment

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With widespread prevalence of digital technology in contemporary higher education, researchers have been keen to identify best practices and understand impacts. Social media present opportunities to cultivate interactive, creative teaching-learning communities. However, inclusion of social media in a course does not necessarily equal deep or creative student engagement. Faculty play an important role in helping students critically and creatively engage with content, colleagues, and context. Utilizing a mixed-methods case study approach, this research explores how contemplative technopedagogy can aid in the development of social media assignments and positively influence student learning. While blogging has been studied as a pedagogical tool, Tumblr has not yet been studied as an educational technology. This research demonstrates how the integration of contemplative technopedagogical attributes can aid faculty in developing social media assignments with contextual awareness that enhance teaching and learning in contemporary higher education.

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INTRODUCTION

In the early 20th century, McLuhan (1960) noticed a gap inhibiting him from fully connecting with his students—neither generational nor intellectual, but the consequence of different modes of learning. Nearly 75 years later, cultural anthropologist Wesch (2013) identified a new kind of gap, writing that “most university classrooms have gone through a massive transformation in the past ten years... As we increasingly move toward an environment of instant and infinite information, it becomes less important for students to know, memorize, or recall information, and more important for them to be able to find, sort, analyze, share, discuss, critique, and create information” (p. 69).

The common thread running from McLuhan to Wesch is an emphasis on understanding learners and contemplating technology in context. Despite this shared focus, emerging technologies and modes of learning are not always evaluated critically. Investigating the relationship between learners and technologies enables the development of a teaching-learning environment that encourages deeper engagement with content, colleagues, and context. This critical approach is especially important in contemporary higher education environments, as “teaching today... is ubiquitously tied to digital technology, and the call to make it more so grows” (Drabinski et al., 2011, p. 3). With widespread prevalence and popularity of digital technology use in contemporary higher education, researchers have been keen to identify best practices and understand impacts of such decisions. This article demonstrates how attributes of the Contemplative Technopedagogy Framework (Shanks, under review) can aid educators in making purposeful and engaged

pedagogical decisions involving digital technology. The utility of this approach is proven via two case studies that explore developing, testing, and revising assignments involving social media as a digital technology in higher education settings.

DIGITAL TECHNOLOGY AND SOCIAL MEDIA USE IN HIGHER EDUCATION

A growing cohort of Science and Technology Studies (STS) scholars have been keen to understand how theoretical inquiry both shapes and is shaped by the intervention of ethnographic social research (Downey and Dumit, 1997; Jensen, 2007; Zuiderent-Jerak and Jensen, 2007; Downey and Zuiderent-Jerak, 2016). Participatory and reflexive, such an approach combines action-oriented and descriptive modes of ethnographic social research. The aim then is to not only change practice, but to also produce new sociological knowledge (Zuiderent-Jerak, 2015). Engaged, action-oriented, and reflexive ethnographic social research has much to offer to the practices it studies, but also has much to learn from those same practices (Zuiderent-Jerak, 2015). From this perspective, the current study seeks to not only understand the practices of digital technology and social media in higher education, but to also shape those practices.

Recent studies point to a variety of positive outcomes associated with incorporation of social media platforms as digital technologies into the teaching-learning environment. Rinaldo et al. (2011, p. 193) investigation of Twitter's pedagogical possibilities suggests that this social media platform leads to "higher involvement with the course material, greater involvement with the professor, and better organization of the course structure." The semester-long experimental study from Junco et al. (2011, p. 128) describes how the integration of microblogging (i.e., Twitter) "can be used to engage students in ways that are important for their academic and psychological development." A diverse body of research demonstrates the benefits of blogging assignments and activities for reflective learning and individual knowledge construction (Foster, 2015), informal learning opportunities and community building (Guerin et al., 2015), as well as resource consolidation and low stakes idea sharing (Saeed et al., 2009). Research from Ventura and Quero (2013) addresses how Facebook facilitates the use of new teaching resources, extends the classroom, fosters a less hierarchical teacher-student relationship, and increases the collaborativeness and flexibility of the teaching-learning process. These and other studies emphasize the growing use and increasing significance of social media as a digital technology within contemporary higher education.

Student engagement in university life can be mediated through social media, which can lead to greater student success (Brown and Burdsal, 2012; Gray et al., 2013). Findings from Gray's et al. (2013) study of social adjustment among college students indicate that social media platforms have the potential to serve as a medium for meaningful support by providing conduits to academic services and peer networks. Furthermore, Hung and Yuen (2010) demonstrate that students' positive learning experiences with the use of social networks were highly

related to information sharing and interactivity. These studies indicate that social media usage can serve to enhance and enrich the student experience. Access to and familiarity with information technologies, however, vary widely among students across demographic categories (Hargittai, 2010). Indeed, the application of social media holds promise for student success, but not every student or educator knows how to use social media for pedagogical purposes (Robinson et al., 2015).

Contemporary university students are often hastily lumped together into the catchall category as "digital natives." Conversely, instructors are routinely depicted as "digital immigrants" (Prensky, 2001; Jones and Shao, 2011; Fisk, 2015). However, more nuance is required for a comprehensive understanding of the teaching-learning environment and its participants. While students regularly utilize digital technologies (e.g., computers, mobile phones, tablets, gaming consoles, social media) for various aspects of their personal lives, this does not necessarily nor effectively translate to creative and critical technological engagement in students' academic lives.

Educational technology research shows the changing nature of students' access to information and engagement in deep learning. For example, students utilize social media to research information that they already perceive as credible (Creighton et al., 2013) and successfully learn course content through social media platforms that extend the classroom (Northey et al., 2015). To engage with a new type of learner "...faculty must find ways that student technology skills can synergistically interact with disciplinary domain knowledge... Faculty will need to provide crucial supporting roles by helping students critically evaluate their effective and appropriate use of technologies" (Moore et al., 2008, p. 6-7). As Levin and Tsybulsky (2017) demonstrate, the technologies and pedagogies of the digital age create a unique educational context that exhibits a profound influence on the ways in which individuals construct knowledge to understand the world. From within the broader context of educational technologies and innovative pedagogies, the present study evaluates the pedagogical utility of Tumblr, a closed source blogging and social media platform.

APPLYING CONTEMPLATIVE TECHNOPELAGOGY ATTRIBUTES TO SOCIAL MEDIA

Social media have experienced substantial growth during the previous decade—in the amount of services, number of users, and variety of uses (Boyd and Ellison, 2007). From a pedagogical perspective, social media provide opportunities for students to critically, and creatively explore course themes. Additionally, students are provided opportunities to engage with course themes outside of the classroom in local, national, and global contexts via social media. Cooke (2015) found the use of social media as an educational technology can impact student motivation and goal orientation by providing better access to information. This paper proposes the integration of contemplative technopedagogy attributes into a social media assignment in order to bolster students' academic and

professional careers by introducing them to larger global issues and facilitating interaction with others in their field.

Using social media, students can create a personalized arena for thoughtful, engaging intellectual exploration centered around the themes and concepts of the course. In describing what he calls “personal cyberinfrastructure,” Campbell (2009, p. 58) stresses the importance of shaping “curricula to support and inspire the imaginations that students need... for creative citizenship in this new medium.” To answer Campbell’s aspirational call, educators can utilize attributes of contemplative technopedagogy when integrating social media into higher education teaching-learning environments. The present study builds upon Campbell’s work by exploring how contemplative technopedagogy can aid in the development of social media assignments and positively influence student learning.

In succinct terms, pedagogy is the theory of education and practice of teaching (Lusted, 1986). Creating assignments, conducting courses, assessing student learning, among other actions of educators are informed by pedagogical theories and strategies. This manuscript is specifically interested in technopedagogy, which is uniquely associated with the integration of digital technology into teaching-learning environments. When considering digital technology, educators should take a thoughtful pause to contemplate *when, which, to what extent, how, with whom*, and *for what purpose* to integrate digital technology into the teaching-learning environment (Newson, 1999; Cook-Sather, 2001; Boisselle et al., 2004).

Contemplation involves thinking carefully, deeply, and attentively about a topic. Integrating contemplation into pedagogy takes many forms and has diverse meanings (Buchmann, 1989). Contemplative pedagogy emphasizes the value of incorporating mediation and other mindfulness exercises in coursework to enhance student attention and learning (Shapiro et al., 2008; Zajonc, 2013). Educators can also integrate contemplation into curriculum through activities that provoke reflection, compassion, commitment, non-judgment, and creativity among students (Zajonc, 2006; Burgraff and Grossenbacher, 2007).

Higher education must also concern itself with the ways in which contemplation can inform technopedagogy. In this manuscript, contemplation refers to practices of purposeful and engaged thought. Following suit, contemplative technopedagogy refers to purposeful and engaged approaches to pedagogical practices involving digital technology. Non-contemplative technopedagogy leads to uncritical adoption or knee-jerk dismissal of digital technology. Whether adoptive or dismissive, non-contemplative pedagogical decisions have substantial consequences for both educators and learners. While it is important for contemporary educators to pay close attention to digital technologies, they must incorporate attributes of contemplation into pedagogical decision-making. Contemplative technopedagogy is applicable in diverse scenarios. Contemplative technopedagogy is iterative and ongoing. Contemplative technopedagogy does not supplant, but rather supplements an educator’s pedagogy. Contemplative technopedagogy provides a framework for making purposeful decisions about *when, which, to what extent, how, with whom*, and

for what purpose to use digital technology in higher education teaching-learning environments.

The Contemplative Technopedagogy Framework (Shanks, under review) requires an educator to simultaneously consider both the positive and negative aspects of a digital technology. This mindset is foundational for engaging in contemplative technopedagogy. Attributes of contemplative technopedagogy are grouped into five areas of focus:

1. *Pedagogy Focused*—pedagogy should guide digital technology decisions, not vice versa.
2. *Learner Focused*—digital technology should foster connections and not create distractions within the teaching-learning environment.
3. *Technology Focused*—commitment from the educator to be both learner and teacher; evolving knowledge about a digital technology and ways it might or might not be applied to the teaching-learning environment.
4. *Attention Focused*—focus less on the polemic rhetorics of disruption and revolution and turn attention to matters of intentionality; think and act intentionally with regard to digital technology and pedagogy.
5. *Context Focused*—probe assumptions and understand preconceived notions about human and technological actors; examine the whys, hows, and consequences of technopedagogical decisions within the larger sociocultural context.

WHY Tumblr?

Tumblr is a blogging and social media platform where students can explore course themes, thoughtfully interact with colleagues’ ideas, and connect with the verdant information landscape of the worldwide web. A large body of research exists that demonstrates the positive learning outcomes associated with reflective writing of this nature via traditional and social mediums (Seale and Cann, 2000; Ryan, 2013). Among several other blogging platforms, Tumblr was selected for this project due to ease of use, functionality, community-building aspects, freeform writing, multimedia integration, and content management system (CMS) supplements. With more than 374 million blogs and over 154 billion posts, Tumblr is a robust blogging platform¹ While blogging has been previously studied as a pedagogical tool for higher education (Saeed et al., 2009; Foster, 2015; Guerin et al., 2015), Tumblr itself remains unexplored. An extensive search of the open web, peer-reviewed publications, and gray literature yielded no results of Tumblr assignments in higher education courses, research about Tumblr usability in higher education courses, or instances of Tumblr used as a portion of an assignment in higher education courses. As such, this study developed a Tumblr assignment utilizing attributes of contemplative technopedagogy. Researchers then examined the pedagogical utility of Tumblr by testing the students’ ability to (1) utilize Tumblr to learn about course topics, (2) engage with

¹About, 2017, October 29. Available online at: <https://www.tumblr.com/about>.

colleagues in the extended online classroom, and (3) apply course materials to larger world issues.

PURPOSE OF RESEARCH

Using a case study approach, this research seeks to demonstrate the utility of contemplative technopedagogy, evaluate the effectiveness of the Tumblr assignment, and develop pedagogical guidelines for using Tumblr as a blogging technology in higher education teaching-learning environments. Specifically, the primary research question asks how contemplative technopedagogy can aid in the development of social media assignments and positively influence student learning.

This research translates philosophies and ideologies from STS, pedagogy, and contemplation by way of case study examples of collaboration between academic librarians, non-library faculty, and students to stimulate contemplative technopedagogical innovation in contemporary US higher education. Mixed methods research and aforementioned interdisciplinary theories are put into practice using Tumblr as a demonstration of how the Contemplative Technopedagogy Framework can aid in creating more self-reflexive and engaging teaching-learning experiences. This research provides practical examples of the accessibility and applicability of the Contemplative Technopedagogy Framework.

METHODS

Applying Contemplative Technopedagogy Attributes to Develop the Tumblr Assignment

This research uses a case study approach to explore the effectiveness of Tumblr as a digital technology and social media blogging platform to achieve learning objectives from two semester-long university courses. The Tumblr assignment was formatively developed in one course and then tested in a second course at Montana State University, a mid-sized public university in the northwestern United States. The courses were selected for case study involvement due to the alignment of learning objectives, instructors' interest in integrating social media into the teaching-learning environment, and instructors' willingness to experiment with attributes of contemplative technopedagogy.

Attributes of contemplative technopedagogy were used throughout development, testing, and revision of the assignment in each course.

1. *Pedagogy Focused*—From the beginning, the development of the assignment was pedagogy focused as the authors decided to integrate Tumblr into the course structure as a method of facilitating student engagement with course content, colleagues, and sociocultural context.
2. *Learner Focused*—The Tumblr assignment was learner focused because it was purposefully presented and utilized in ways that intended to enhance, and not distract, student's ability to connect with course content, colleagues, and sociocultural context.
3. *Technology Focused*—In addition to facilitating enhanced connection for student learning, the authors maintained

a focus on the need to understand and assess the digital technology itself. The Tumblr assignment provided opportunities for students and educators to discuss how usability and functionality of the platform did or did not aid in accomplishing learning objectives. Furthermore, the Tumblr assignment was revised based upon instructor reflection and student feedback.

4. *Attention Focused*—The authors focused specific attention on the fact that the Tumblr assignment was utilized as one component of the course to accomplish student learning outcomes and was not expected to revolutionize the teaching-learning environment in and of itself. The authors were intentional about designing the courses with a digital technology assignment that engendered a “personal cyberinfrastructure” for students to engage in thoughtful exploration around course themes. Further, the Tumblr assignment was designed to bridge course content and out of class exploration.
5. *Context Focused*—Successfully integrating Tumblr required authors to understand student's familiarity with this particular social media platform, while also nudging students to be comfortable with non-traditional modes of exploration. The Tumblr assignment was thus adapted and revised in an iterative and ongoing process for each course.

Throughout each course, the Tumblr assignment required students to create and publish posts while also replying to and commenting on the posts of classmates. Students were subsequently asked to provide formal feedback in each course about their use of social media. Students also provided informal feedback through course discussions and other assignments. Findings from the first course were used to refine the assignment framework for the second course. Findings from the second course were used to create a new version of the Tumblr assignment.

What follows is an in-depth examination of the formation, implementation, and evaluation of the Tumblr assignment by course.

Case Study 1—Community Nutrition

In fall 2014, 53 junior and senior level college students were enrolled in an upper-level community nutrition course with a learning objective to “develop a variety of communication skills sufficient to use in pre-professional practice” for dietetics accreditation. The instructor collaborated with the first author to develop and test the Tumblr assignment that would meet several learning outcomes, including: encourage critical thinking about community nutrition topics highlighted in course materials, improve professional technology use and writing skills, and develop student's ability to translate research to an interdisciplinary, non-expert audience (i.e., the public).

Several social media platforms were explored to determine the most appropriate tools for blogging use in the classroom. An assignment was developed that included Tumblr and Twitter and sought to determine if blogging and microblogging (i.e., condensed blog posts) were effective for encouraging student engagement, classmate interaction, and critical thinking about

course topics. Due to its interface and functionality (described above), Tumblr was selected as the blogging platform. Twitter was also utilized to emphasize social media genre diversity and enable translation of Tumblr blog content into more concise 140 character Tweets.

For their Tumblr and Twitter assignment, students were asked to select a topic of interest related to course themes and conduct research throughout the semester. With guidance from the instructor and a university librarian, students created an annotated bibliography of three articles related to the selected research topic to familiarize themselves with available scientific literature. Then, the first author worked as a guest instructor with students to create their own Tumblr sites and Twitter accounts that would allow for critical reflection and content sharing regarding individual research topics and course concepts. During the 15-week semester, each student was responsible for at least 15 Tweets (one per week) and seven Tumblr blog posts (three before mid-semester and four by the end of the semester). Guidelines instructed students to write at least 300 words for each Tumblr post and provided creative methods for operating within Twitter's 140-character format. Students were encouraged to include, embed, or link to peer-reviewed journal articles, news media, blog posts, social media content, diagrams, figures, tables, photos, Wikipedia, popular press, or other information related to the research topic. In an effort to foster ongoing dialogue, students were asked to space their Tumblr posts throughout the semester and not complete all posts immediately before due dates. Students were instructed about how to "follow" other classmates' Tumblr and Twitter accounts and expected to engage with classmates' social media activity by commenting and sharing. Detailed instructions, examples, practice time, and expert review were provided to assist students with blog development and content creation in order to bolster effective communication and critical engagement. During subsequent class sessions, students met face-to-face with the first author and course instructor to discuss and ask questions about blog content and issues. Additionally, students were encouraged to contact and meet with the first author and/or instructor at any time. Students were also provided time to engage the entire class in informal discussion about Tumblr and Twitter best practices for learning as well as methods for improving the assignment.

Questionnaire for Case Study 1

The evaluative questions for Case Study 1 were designed with the Contemplative Technopedagogy Framework. Specifically, formal feedback about the assignment was collected at the end of the semester to guide pedagogical decisions about digital technology use, understand connections and distractions created in the teaching-learning environment due to the assignment, and improve the assignment based upon the learner's experience. Quantitative evaluation questions asked students to rate their level of agreement (using a Likert scale: 1 = strongly disagree; 5 = strongly agree) with three statements about the assignment and two yes/no questions about social media usage (see **Table 1**).

Students were also asked for qualitative responses to two open-ended questions about assignment structure with the aim of improving future iterations (see **Table 2**).

TABLE 1 | Descriptive Statistics for Twitter and Tumblr assignment from community nutrition at Montana State University, Fall 2014 ($n = 50$).

Section 1. Level of agreement (1 = strongly disagree; 5 = strongly agree)

| Question | Post test Mean \pm SD |
|---|-------------------------|
| Tumblr and Twitter were useful for learning about nutrition topics | 3.90 \pm 0.86 |
| Tumblr and Twitter helped me to learn from colleagues about nutrition topics | 4.02 \pm 0.80 |
| Tumblr and Twitter helped me to apply course material to larger world issues learned in this course | 3.94 \pm 0.77 |

Section 2. Yes or No

| Question | % Yes post |
|--|------------|
| Have you ever used Tumblr before this course? "Used" defined as having an account or looked at Tumblr previously. | 8 |
| Have you ever used Twitter before this course? "Used" defined as having an account or looked at Twitter previously. | 24 |

Case Study 2—Information Literacy

In spring 2015, 26 undergraduate students were enrolled in an introductory library science course. The learning objectives focused on finding, evaluating, and applying information resources for scholarly research. This course was taught by the second author, who collaborated with the first author and course instructor for Case Study 1 to develop and test the Tumblr assignment that would encourage critical thinking about information topics, improve the use of academic technology, and develop student's ability to locate and evaluate information resources.

For the social media component of the course, students were asked to coordinate weekly reading assignments and communicate responses through peer-learning networks using Tumblr. Following the results of Case Study 1 (discussed in more detail below), Case Study 2 focused on the application of Tumblr and did not include Twitter. Following the model provided by Case Study 1, the second author worked with students to create their own Tumblr sites that would allow for critical reflection and content sharing for individual research and course concepts. Students were initially separated into six groups of five students for small-group discussions via Tumblr. Hashtags were created for each group, and students were asked to focus discussion within assigned groups. The second author provided students with a thematic discussion structure, which included an overall topic for each week's discussion shaped around a small selection of readings related to information literacy. Each week, students were asked to produce one original post and two comments in response to classmates' Tumblr posts. Students were encouraged to explore ideas openly and without a prescribed word length, while incorporating external resources as appropriate to the discussion. The instructor for Case Study 2 was present throughout these discussions as a moderator who

TABLE 2 | Qualitative questions and thematic analysis for a social media assignment used in community nutrition undergraduate course at Montana State University ($n = 50$).**Qualitative questions**

Question 1—What do you now know that you wish you knew when you started using Tumblr and Twitter?

Question 2—What else would you like to add about the Tumblr and Twitter assignment that I did not ask?

Thematic analysis*

| Theme | #MU | Example meaning unit |
|-------------------------|-----|--|
| Usability | 40 | That you can post dates for later posts. This would help you write multiple posts and have them post at a later date. I really like the format of adding photos. |
| Depth and detail | 31 | I like Tumblr [vs. Twitter] better because you can write some real thoughts and information. |
| Scholarly communication | 11 | I now know more about social media and how it can be helpful for learning new facts. |
| Community | 8 | It was interesting connecting with other organizations and programs that addressed my research issue. |
| Course structure | 5 | I would have liked one social media tool, not two. |

*Emergent major themes, number of meaning units in which theme was present (#MU), and example meaning units. Each response was counted and categorized as a single meaning unit.

occasionally contributed responses in an effort to synthesize or connect ideas expressed by the students.

Questionnaire for Case Study 2

In line with the Contemplative Technopedagogy Framework, the evaluation questions for Case Study 2 were revised to more deeply understand Tumblr's impact on the teaching-learning environment. In order to evaluate the student experience, a pre-test was incorporated into Case Study 2 that measured students' familiarity with and interest in social media at the onset of the course. Students completed this pre-test during Week 1 of the course. During Week 15, students completed a post-test (modeled on the post-test of Case Study 1) to measure students' familiarity and interest with social media at the conclusion of the course. Quantitative evaluation questions asked students to rate their level of agreement (using a Likert scale: 1 = strongly disagree; 5 = strongly agree) with three statements about the assignment as well as two yes/no questions about social media usage (Table 3). Students were also asked for qualitative responses to two open-ended questions about assignment structure with the aim of improving the next version of the assignment (Table 4).

Data Analysis

Quantitative data was analyzed using SPSS (version 18.1). Face validity of the questionnaires was established by circulating instruments among experts within the field. Qualitative data was analyzed by developing themes and subthemes (Lasswell et al., 1952; Weber, 1990; Krippendorf, 2012) from courses separately and collectively. The researchers identified and operationally defined emerging themes and added to a qualitative code book. The researchers then independently coded all qualitative responses and thereafter compared independent coding for intercoder reliability. Any discrepancies were resolved via discussion. Data trustworthiness was established by comparing quantitative and qualitative results to achieve confirmability. For Case Study 1, survey questionnaires were released post Tumblr assignment. Descriptive statistics including means, percentages, and standard deviations were used to describe the

post dataset. For Case Study 2, authors designed and collected pre and post questions. Descriptive statistics including means, percentages, and standard deviations were used to describe both pre and post datasets. An independent t -test was used to compare mean pre-test to post-test scores for questions addressing comfort, usefulness, and application variables. A bivariate Pearson Correlation was used to measure the strength of the relationship of social media use in comfort, usefulness, social media use in other courses, and application variables. Statistical significance was set at a two-sided alpha level of $p < 0.05$. This alpha level indicates that our results can be reported with 95% confidence within the scope of the study.

This study was carried out in accordance with the recommendations of The Belmont Report and Montana State University's Institutional Review Board. The protocol was approved by Montana State University's Institutional Review Board and confirmed as exempt from the requirement of review by the Montana State University Institutional Review Board in accordance with Code of Federal Regulations, Part 46, Section 101. Authors were approved to retroactively utilize anonymous and coded data from student evaluations collected from a class assignment to conduct research about the use of Tumblr as a pedagogical tool.

RESULTS**Case Study 1—Community Nutrition**

In total, 50 students completed the Tumblr and Twitter assignment post-test survey. Three students did not complete the survey questions due to absence. Students agreed that the Tumblr and Twitter assignments (Table 1):

- Were useful for learning about nutrition topics (3.9 ± 0.86)
- Helped the student learn from colleagues about nutrition topics (4.0 ± 0.80)
- Helped the student apply course material to larger world issues addressed in the course (3.9 ± 0.77).

Qualitative data helped illuminate student perspectives about the pedagogical usefulness of Tumblr and Twitter. Across qualitative

TABLE 3 | Mean pre and post test scores for Tumblr assignment from information literacy at Montana State University, Spring 2015.

| Section A—Level of agreement (1 = strongly disagree; 5 = strongly agree) (n = 26) | | |
|--|----------------------------|----------------------------|
| Question | Pre-test Mean ± SD* | Post-test Mean ± SD |
| I am comfortable navigating Tumblr | 2.3 ± 1.00 ^a | 3.9 ± 0.99 ^b |
| Tumblr will be/was useful for learning about [course] topics | 3.46 ± 0.93 ^a | 4.12 ± 1.03 ^b |
| I have used social media (e.g., Facebook, Twitter, Tumblr, WordPress) for a course in the past | 2.29 ± 1.52 ^a | 2.13 ± 1.51 ^a |
| Tumblr will help/helped me to apply course material to larger world issues learned in [course] | 3.46 ± 0.98 ^a | 4.25 ± 0.94 ^b |
| Section B—Yes or No (n = 26) | | |
| Question—Please check the social media you use in your personal life | % Yes pre | % Yes post |
| Facebook | 100 | 100 |
| Twitter | 25 | 33 |
| LinkedIn | 4 | 13 |
| Tumblr | 4 | 42 |
| WordPress, blogger, etc. | 4 | 4 |
| Pinterest | 54 | 63 |
| Google+ | 25 | 21 |
| Instagram | 79 | 75 |
| Vine | 13 | 21 |
| Flickr | 0 | 8 |
| Snapchat | 75 | 71 |

*Means with different superscripts (^{a,b}) across rows are significantly different ($p < 0.05$) based on paired t-tests, denoting changes in construct scores.

data collected during Case Study 1, 42 meaning units and five themes emerged. Qualitative themes included usability, depth and detail, scholarly communication, community, and course structure (Table 2).

A majority ($n = 40$) of the qualitative responses in Case Study 1 focused on usability. Students focused on the functional aspects of the social media tools for more useful utilization of both Tumblr and Twitter. Suggestions for Tumblr included searching hashtags for content specific information, writing posts and scheduling for a later time, reblogging, adding photos, how to follow people or organizations, and commenting. Recommendations for learning to use Twitter included understanding the limited amount of characters allowed in Tweets and how to use the @ and # symbols in posts.

Students also focused on the amount of depth and detail ($n = 31$) that each platform requires and/or provides. Overall, students explained that Tumblr required far more time than Twitter to create a quality post, but that the information shared via Twitter was not as rich as that available via Tumblr. One student expressed a viewpoint shared by most other students, “Tumblr was better because I got more info and I learned more by reading and transferring my thoughts into words.”

Additional meaning units focused on the scholarly communication role of Tumblr and Twitter ($n = 11$). Student responses focused on the ability to engage and communicate with people and organizations inside and beyond the classroom. Students appreciated learning new topics, connecting with other accounts related to their field of study, and sharing their own research with the social media world. One student commented, “I definitely now see the value in social media. I had not before.”

Community ($n = 8$) explored the ways in which students built participation with their social media sites. Students discussed the influence of word length on participation, approaches to online community building, and garnering ‘likes’ on posts.

Further responses ($n = 5$) centered on the assignment framework itself. While students commented that they felt well-prepared with assignment directions, they suggested that focusing on one social media tool would be better for learning outcomes.

The course instructors and first author met to discuss the results of Case Study 1 and used the information provided by students to influence the development of the assignment for Case Study 2. Student responses from Case Study 1 indicated that Tumblr was more pedagogically promising than Twitter. Tumblr received more favorable reviews and students also appreciated the in-depth research and writing required for the platform. Tumblr was therefore chosen as the sole platform for the social media assignment framework explored in Case Study 2.

Case Study 2—Information Literacy

In total, all enrolled students ($n = 26$) completed the Tumblr assignment pre-test and post-test surveys for Case Study 2. See Table 3. Students’ comfort level utilizing Tumblr significantly ($p=0.00$) changed. Pre-assignment students disagreed (2.3 ± 1.00) that they were comfortable navigating Tumblr and post-assignment students agreed (3.9 ± 0.99) that they were comfortable navigating Tumblr. Data also suggest that there was a significant ($p = 0.02$) change in student’s opinions about the usefulness of Tumblr for learning course topics, from neutral (3.4 ± 0.95) to agree (4.1 ± 1.03). Significant ($p = 0.01$) changes

TABLE 4 | Qualitative questions and thematic analysis for a social media assignment used in information literacy undergraduate course at Montana State University ($n = 26$).**Qualitative questions**

Question 1 Pre—What do you wish you knew about how to use Tumblr (e.g., how can I help you make this assignment easier to navigate)?

Post—What do you (still) wish you knew about how to use Tumblr? Anything particularly confusing or troublesome about using Tumblr for our class?

Question 2—Pre and post—What else would you like to add about the Tumblr assignment that I did not ask?

Question 3—Post—Summarize your experience using Tumblr in this course. If you wish, please provide examples of how Tumblr helped (or did not help) you engage with course topics and classmates.

Thematic analysis*

| Theme | #MU | Example meaning unit |
|-------------------------|-----|---|
| Usability | 50 | It would be nice to have like a categorized group that I could look at visually rather than just using hashtags to communicate to other members of the group. |
| Interest and motivation | 8 | Having to communicate over a blogging site added a fun and different twist on writing, as it created a less stressful atmosphere for writing that is more personal and creative. I really enjoyed it. |
| Community | 5 | My experience was positive and it was nice getting feedback from the class and seeing all the different opinions on our topics for the week. |
| Course structure | 3 | Could there possibly be a course calendar with due dates, so I know when to exactly have everything done by? |
| Scholarly communication | 1 | Tumblr is a great way to get your thoughts down in writing. Another way that Tumblr was helpful was through the use of hashtags; clicking on them opened up a portal to a world of that topic! |

*Emergent major themes, number of meaning units in which theme was present (#MU), and example meaning units. Each response was counted and categorized as a single meaning unit.

were observed in student's pre and post answer to the ability of Tumblr to help apply course materials to larger world issues, from neutral/agree (3.5 ± 0.98) to agree (4.3 ± 0.94). A large difference was found between Tumblr use in the student's personal life before the assignment vs. Tumblr use in the student's personal life post assignment from 4 to 42%.

Qualitative data helped illuminate student perspectives about the usefulness of Tumblr to accomplish learning objectives. Across qualitative data, 68 meaning units and five themes emerged. Qualitative themes included usability, interest and motivation, course structure, scholarly communication, and community (Table 4).

A majority ($n = 50$) of the qualitative responses in Case Study 2 focused on usability. As in Case Study 1, students in Case Study 2 focused on the functional aspects of the social media tool for more effective utilization of Tumblr. General ease-of-use of Tumblr was an issue for many students, with specific focus on the navigation, commenting, and notification functionality for the platform. One student responded, "Still don't get comment notification like on Facebook and even after I modified my settings, I still found it confusing to find and respond to who had commented." Likewise, another student commented, "I do not like how cumbersome it is to comment on other people's blog." The learning curve for Tumblr proved steep for some students. With additional instruction, however, the platform's idiosyncrasies were overcome, as another student responded, "Once I met with you and it was explained to me Tumblr was easy to use and navigate." Indeed, with clear—and often repeated and reemphasized—instructions for posting, commenting, and site navigation, Tumblr became an asset for those students who approached it as both a learning tool (i.e., using a digital technology to facilitate learning) and a

learning object (i.e., learning about a digital technology). Another response represented this experience, "I feel like I had a lot of fun using Tumblr and learning how to use it. It made this learning experience a lot of fun for me."

Students also discussed their own interest and motivation ($n = 8$) with regards to social media. This meaning unit was related closely with usability, as many students experienced increased interest in the platform once its basic functionality was understood. One student responded, "At first, Tumblr was really confusing for me until I figured out how to use it, which just took some time...I think it was a fun way to interact and communicate with our classmates!" An attitude of enjoyment was reflected by others in the class, who noted that "using Tumblr was cool" and that "having to communicate over a blogging site added a fun and different twist on writing, as it created a less stressful atmosphere for writing that is more personal and creative. I really enjoyed it."

Two further meaning units appeared in students' qualitative responses, community ($n = 5$) and scholarly communication ($n = 1$). These two related meaning units revealed students' desire to engage with course topics through peer interaction, thereby effectively accessing and building scholarly communities online. One student noted, "I enjoyed how even though [this class] was an online class I engaged with my classmates a lot." Another student attributed a positive class experience to "seeing all the different opinions on our topics for the week." One comment specific to Tumblr showed the learning and community value of the platform's hashtag functionality, "Another way that Tumblr was helpful was through the use of hashtags; clicking on them opened up a portal to a world of that topic!"

Concerns about course structure ($n = 3$) were also present in qualitative responses. A few students expressed a desire to have clearly defined due dates and an integrated calendar function

that is not currently available through Tumblr. Another student identified a difficulty with assignment management, “I already missed a deadline because I was not understanding everything that was being asked or was unsure when things were due.” Whereas, the initial social media exercise in Case Study 1 offered a structured walk-through (with relevant screenshots) for opening and utilizing a social media account, the initial social media exercise in Case Study 2 offered comparatively unstructured guidance for opening a social media account and creating posts. Student responses from Case Study 2 indicated that additional structure would have benefited students by providing clearer guidance in platform navigation, posting and commenting procedures, and effective use of hashtags.

Tumblr Assignment

When developing assignments involving digital technology such as Tumblr, instructors must balance the various attributes of contemplative technopedagogy in a way that acknowledges students’ course topical knowledge, information literacy, and (un)familiarity with specific digital technology. Assignments involving social media such as Tumblr must not be overly prescriptive so as to hamper student creativity. However, such assignments must simultaneously offer sufficient instructional detail in order to guide students through a process of critical engagement with the digital technology. In response to student feedback from Case Study 1 and Case Study 2, the authors developed a new version of the Tumblr assignment. This new iteration of the assignment better addresses students’ topical knowledge, information literacy, and (un)familiarity with Tumblr. Depending upon instructional setting (e.g., in-person, online, hybrid), Tumblr and the associated assignment are introduced via instructor walk-through as well as documented instructions. Maintaining the initial step of blog creation and personalization, the assignment was reconfigured to help students more quickly develop familiarity with and confidence using Tumblr. After creating a Tumblr blog, students are asked to (1) publish a first blog post featuring a common course hashtag and (2) write a comment on a colleague’s blog. Highly structured and broadly applicable, this revised approach to onboarding helps students gain confidence using social media in higher education while also demonstrating individual student familiarity with the technology and helping cultivate a connected learning community. Lessons learned from this study have produced a new assignment for integrating Tumblr into the higher education teaching-learning environment.

DISCUSSION

This evaluative study demonstrates how contemplative technopedagogical attributes can aid higher education instructors in incorporating social media, such as Tumblr, in ways that facilitate student engagement, community building, and critical thinking. This research utilized a mixed-methods case study approach to explore how contemplative technopedagogy can aid in the development of social media assignments and positively influence student learning. Through two case studies, the authors relied upon attributes from the Contemplative

Technopedagogy Framework to develop a Tumblr assignment and then demonstrated that Tumblr can serve a pedagogical role by facilitating student-led learning when coupled with detailed directive guidance from the instructor and interaction with classmates through the social media platform. The research addressed herein lends to a larger discussion about contemplative technopedagogy and social media use beyond Tumblr and more broadly for research and practice in higher education.

Contemplative Technopedagogy and Social Media in Practice

Attributes from the Contemplative Technopedagogy Framework: Pedagogy Focused, Learner Focused, Technology Focused, Attention Focused, Context Focused, were utilized throughout the research process in order to purposefully integrate social media into higher education teaching-learning environments. Tumblr presents opportunities to enhance student interaction and engagement in learning through reflective construction of knowledge within a social media platform (Levin and Tsybulsky, 2017). However, before such change can be realized, “faculty must begin by examining their pedagogical objectives before introducing new elements to the learning equation” (Moore et al., 2008, p. 6). Our research findings support this perspective. An assignment involving social media should include discussion of three key points:

- Explicit connections to course learning objectives
- Highly detailed and repetitive instruction about platform usability and functionality
- Consistent instructor engagement with the platform, functionality, and student-generated content throughout the semester.

As evidenced by themes that emerged through qualitative data analysis, the student experience was highly dependent upon interaction among students and faculty as well as clarity of instruction. The Tumblr assignment changed in response to this finding. For example, students in Case Study 1 requested more detail about hashtags. In response, the first author addressed hashtags specifically with the group and then both authors changed the Tumblr assignment before implementation during Case Study 2. Incorporating social media as a digital technology in higher education requires careful instructions, assignment testing, and responsiveness to feedback.

Although conducted in distinct instructional settings, similar themes emerged from both case studies. However, some meaning units focused on aspects unique to each instructional setting. For example, although both case studies indicated the significance of community, the emphasis on establishing connections with classmates depended upon whether or not students were meeting in-person and online (Case Study 1) or online only (Case Study 2). Qualitative responses from Case Study 2 were more attentive to the ways in which social media facilitated relationship-building among classmates in an online teaching-learning environment.

A contextual understanding of technology in higher education enables instructors to determine when, how, why, and to what extent social media fit into the teaching-learning

environment. Higher education instructors must identify their own assumptions regarding students' familiarity with social media platforms. Students may regularly use social media, however such frequency does not necessarily nor effectively translate to critical engagement with social media in students' academic lives. For example, Case Study 2 overestimated students' familiarity with social media genre conventions and Tumblr functionality, thereby influencing how, when, and why students engaged with Tumblr during early stages of the course. Consequently, incorporating student feedback and authors' reflection regarding experiences from each course, the new version of the assignment focuses on early and in-depth engagement with Tumblr. Similar evidence from both case studies debunks assumptions attributed to the digital native paradigm. Although generally familiar with social media, many students (92% in Case Study 1 and 96% in Case Study 2) had not used Tumblr prior to the assignment. To realize the potential of Tumblr in higher education, it is necessary to develop assignments and frameworks with contextual awareness. "In line with learner-centered pedagogy, faculty should be encouraged to recognize, respect, and leverage student knowledge and skills in the realm of technology" (Moore et al., 2008, p. 6). To realize course objectives and technological opportunities, it is important not only to teach course content, but also to teach the technology. More importantly, it is necessary to teach in a way that engages students in creative and imaginative exploration—an approach that works well for teaching course content as well as technology.

Future Research

Future work could richly build upon research addressed herein to investigate Tumblr and other social media platforms in diverse educational settings. This case study research was conducted at a mid-sized public university in the northwestern US. Given the inherent contextual specificity of case study research, results may not be generalizable to all settings or populations. Nevertheless, the two case studies herein provided opportunities to answer the research question using an in-depth approach. Future researchers should critically evaluate the findings of this work within their own unique research contexts. In effort to increase generalizability, future research should adapt methods and findings reported herein to diverse settings and populations. Methods could be expanded and iterated to include smaller and larger sample sizes, various academic disciplines, as well as in-person vs. online classrooms. Other measures should focus on a wider range of variables that impact student learning, including group dynamics, engagement, learning, and critical thinking. The nature of self-reporting is subjective and biased by the participant. A study of social media would benefit from objective observational measures in addition to

self-reporting. Our findings lend further credence to the nuanced understanding that students are not always "digital natives." Future research should explore the extent to which students are in fact often "digital immigrants" with respect to critical technological engagement.

CONCLUSION

This research used a case study approach to apply the Contemplative Technopedagogy Framework to evaluate the effectiveness of and develop pedagogical guidelines for a Tumblr assignment for use in higher education teaching-learning environments. Our research provides a useful framework developing, testing and revising Tumblr or other social media for use in higher education. Results indicate that Tumblr presents a pedagogical opportunity for building creative, student-led learning communities. However, merely adding social media is insufficient. Echoing McLuhan and Wesch, our findings emphasize the importance of creating social media assignments that are responsive to contextual dynamics that influence modes of learning. Following a contemplative technopedagogy framework, higher education can more effectively use social media to create interactive teaching-learning environments that encourage open and imaginative engagement with content, colleagues, and context.

Social media platforms such as Tumblr can be utilized in learning environments to enhance learning by facilitating peer connections and information exchange. In his call for a creativity-enhancing, imagination-broadening higher education, Campbell (2009) emphasizes, "students not only would acquire crucial technical skills for their digital lives but also would engage in work that provides richly teachable moments ranging from multimodal writing to information science, knowledge management, bibliographic instruction, and social networking" (p. 59). Our research findings suggest that Tumblr can help create a learning environment congruent with Campbell's vision of higher education. Incorporating social media into higher education presents opportunities to emphasize the importance of open and imaginative teaching-learning environments.

AUTHOR CONTRIBUTIONS

JS initially conceived of and designed the research and social media assignment. Collaborator, SY provided input regarding research design and iterative social media assignment development. JS led manuscript composition. SY contributed to drafting and revising the manuscript. JS and SY collected study data. Both authors analyzed and interpreted data.

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