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DELVING INTO THE SPECIFICITY OF INSTRUCTIONAL GUIDANCE IN SOCIAL MEDIA-SUPPORTED LEARNING ENVIRONMENTS

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ABSTRACT

Aim/Purpose: This study investigates the variations in student participation patterns across different types of instructional activities, learning modes, and with different instructional guidance approaches. In the current study, different variables, modes of learning (guided versus unguided), and types of guidance (social versus cognitive) were manipulated in a series of microblogging-supported collaborative learning tasks to examine to what extent and in which aspects instructional guidance affects the effectiveness and student perception of microblogging-supported learning.

Background: Despite the overwhelming agreement on the importance of instructional guidance in microblogging-supported learning environments, very few studies have been done to examine the specificity of guidance, such as how to structure and support microblogging activities, as well as what types of guidance are appropriate in what learning contexts.

Methodology: This semester-long study utilized a case-study research design via a multi-dimensional approach in a hybrid classroom with both face-to-face and online environments. Tweets were collected from four types of activities and coded based on content within their contextual setting. Twenty-four college students participated in the study.

Contribution: In response to the call to improve social media learning environments underscored in contemporary education, the current case study took an initial step aiming at deepening the understanding of the role of instructional guidance in microblogging-supported learning environments.

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Findings	This study showcases that with instructor facilitation, students succeeded in being engaged in a highly participatory and interactive learning experience across a variety of tasks and activities. This study indicates that students' perspectives of social media tools rely heavily on what instructors do with the tool and how the instructional activities are structured and supported. Instructors' scaffolding and support is instrumental in keeping students on task and engaging students with meaningful events, thus ensuring the success of microblogging-based learning activities. Meanwhile, students' perception of usefulness of instructional guidance is closely related to their own pre-perception and experience.
Recommendations for Practitioners	When incorporating social media tools, it is important to examine learners' prior knowledge and comfort level with these tools and tailor the design of instructional activities to their attributes. It is also vital to monitor student progress, adjust the type and amount of guidance and scaffolding provided as they progress, and eventually remove the scaffolding until students can demonstrate that they can perform the task successfully without assistance.
Recommendation for Researchers	Due to many other potential factors in place that could potentially influence student learning, no conclusive remarks can be made regarding the superiority of either one type of guidance approach. Future researchers should continue to develop robust research methodologies to seek ways to better operationalize this variable and strive to understand its effect.
Future Research	Future replication studies in other settings, with a larger sample size and different populations will certainly provide further insights on the effects of instructional guidance in microblogging-based learning. Alternative coding methods may also shed light on differences in student interaction in terms of content diversity and depth of learning when analyzing the tweets. Advanced data collection techniques may be explored to ascertain the completeness of data collection.

Keywords instructional guidance, social media, microblogging, Twitter

INTRODUCTION

Instructional guidance and assistance provided during a learning task or activity is instrumental to the success of student learning. Many seminal instructional theories and models have placed a special emphasis on the importance of instructional guidance. For example, in Gagné's (1985) classic instructional design model, affording learner guidance is foregrounded as one of the pivotal nine events of instruction that helps learners to approach the most effective and efficient way of learning. Through modeling and demonstrating to learners how to learn, learning largely increases as it aids students in eliminating misconceptions and, therefore, reducing the frustration that can result in additional learner practice. Instructional guidance can often take a variety of forms and approaches. For example, scaffolding is a form of temporary support system that externally helps a learner on the learning path toward the maturation of understanding or mastery of a task through providing cues, hints, and prompts, which can be removed when the learner reaches maturation or mastery (Belland, 2014). Additionally, instructional tools such as concept maps and graphic organizers are alternative forms of instructional guidance that meet learners disparate needs based on different learning stages and tasks.

Social media tools such as Facebook and Twitter have been increasingly prevalent in teaching and learning as more educators have started to capitalize their advantages in fostering learner engagement

and interaction (Greenhow, 2011; Greenhow & Lewin, 2016; Greenhow, Robelia, & Hughes, 2009; Tess, 2013). Despite the affordances in expanding virtual participation and cultivating learning communities, extant literature has suggested that instructional guidance and support need to be in place for learning to take place. Without guidance and support, the amount of noise information on the web could easily overwhelm or distract learners, therefore defeating the purpose of using social media (Dunlap & Lowenthal, 2009; Holotescu & Grosseck, 2009; Luo & Gao, 2012). Additionally, research shows that students who possess ingrained use of social media purely as a communication and recreational tool may find the educational use of such tools mandated by instructors to be counterintuitive and preposterous (Luo, 2015, 2016). Although instructional guidance is deemed important and necessary in social media-supported learning environments, extent literature does not specifically address the nuances, such as what type and in what ways guidance need to be in place. Hence, more investigation into this matter is warranted to shed light on the critical role of instructional guidance in social media-supported learning environments.

Responding to this call, this study investigates the variations in student participation patterns across different types of instructional activities and learning modes, using different instructional guidance approaches. In the current study, different variables, modes of learning (guided versus unguided), and types of guidance (social versus cognitive) were manipulated in a series of microblogging-supported collaborative learning tasks to examine the extent and in which aspects instructional guidance affects the effectiveness and student perception of microblogging-supported learning. The comparison between the effect of social versus cognitive guidance is non-existent in the current literature. This paper begins with a review of literature on the general subject area pertaining to instructional guidance along with computer-based technologies while delving into the specificity of a guided approach in microblogging-supported learning environments. The study's methods, procedures, data collection, and analysis were explained subsequently. The results and discussion sections provide detailed findings of the study and detailed interpretations of those findings, as well as suggestions and recommendations to practitioners. The conclusion section provides a synthesis of the article given the context of extant literature, and further recommendations for future researchers given the limitations.

LITERATURE REVIEW

RESEARCH ON INSTRUCTIONAL GUIDANCE

A predominant number of empirical studies that compared unguided versus guided learning approaches have shown the superiority of the guided approach in teaching knowledge and skills across a wide variety of knowledge domains since the 1950s (Mayer, 2004). Research that used experimental designs to allow for controlled experiments suggested that students should be guided explicitly on what to learn and how to learn when their prior knowledge on the subject is largely lacking (Ardac & Sezen, 2002; Elshout & Veenman, 1992; King & Rosenshine, 1993). For example, in teaching problem-solving skills, students who were placed in guided discovery groups learned more efficiently and performed better on tests of both immediate and delayed retention (Craig, 1956; Kittel, 1957). Meta-analysis and literature review studies have informed educators that full-flown guidance is more effective than partial or no guidance for novice learners who encounter a new content area (Kirschner, Sweller, & Clark, 2006; Mayer, 2004). Researchers attributed the superiority of the guided approach to specific brain functions, the structure of cognitive architecture. The process of cognitive learning is one in which information stored in short-term memory transfers into long-term memory and thus alters the existing structure of long-term memory. According to cognitive load theories, the working memory is limited to process a significant amount of information at a given time. If the working memory is overloaded, it hampers the abilities of the brain to solve problems and successful transfer information to long-term memory (Chandler & Sweller, 1991; Sweller, 1994). With minimal or no guidance, working memory is easily overloaded with extraneous information; therefore, less capacity is available for information-processing and for learning to occur (Kirschner et al., 2006). In particular, for novice learners who have scarce prior knowledge, it is more effective to provide direct in-

structional guidance on the subject matter than to use the discovery approach, in which learners attempt to discover knowledge and ways to learn on their own (Mayer, 2004).

Researchers found that in computer-based instruction, guidance tends to be increasingly needed due to the higher cognitive load placed on students in an unassisted computerized-simulation environment (Reiser, Cohen, Hamid, & Kimberg, 1993). For example, a recent study in veterinary education indicated that the guided usage of multimedia learning materials leads to higher levels of knowledge and skills mastery (Govaere, Kruif, & Valcke, 2012). Because they are out of reach of instructors' direct instruction and immediate feedback, students who learn in computer-based environments are required to have higher levels of meta-cognitive and intellectual skills in order to achieve expected learning outcomes as compared to face-to-face classroom environments where immediate instructor feedback is often available (de Jong & van Joolingen, 1998). Mayer (2004) concluded that there are two major reasons to which the superiority of the guided approach can be attributed: (a) students' prior knowledge bases are activated to allow for more meaningful knowledge construction; (b) students are able to sort and incorporate new information into existing knowledge bases held in their long-term memories.

Different types of instructional guidance have been proposed by researchers to provide a classification scheme with which to examine this subject. In the collaborative learning domain, researchers also classified the types of instructional guidance as cognitive-task- or social-interaction-related, which aligns with key concepts in the socio-cognitive demands of collaborative design (Lehrer, Erickson, & Connell, 1994; O'Donnell & O'Kelly, 1994). Cognitive guidance aims to provide adequate task schemas to guide students' problem-solving processes, whereas social guidance is to support effective social interaction during group communication and teamwork processes. Studies on small group collaborative learning suggested the critical role of effective social interaction in social learning processes and outcomes (Nastasi & Clements, 1991; O'Donnell & O'Kelly, 1994). In an experimental study where middle school students' performance and learning were examined, researchers found that social-interaction-related guidance was more effective than cognitive-task-related guidance in terms of learning outcomes of achieving history knowledge and skills (Zahn, Krauskopf, Hesse, & Pea, 2012).

On the other hand, some researchers also cast doubts on whether the guided approach is applicable across different subject matter and to learners with varying characteristics. Researchers cautioned that the implementation of instructional guidance in the experimental studies is confined to the specific learning contexts and the participants targeted in those studies. The generalizability of such findings is questionable given the limited settings and particular learners (Webb & Farivar, 1994). After all, the success of learning largely relies on student-related factors, such as students' intellectual ability and motivation, rather than instructional factors alone (Elshout & Veenman, 1992). Other research bolstered non -or minimal guidance because external interventions from instructors may interfere with learners' natural learning processes and their learning prepositions (Schmidt, 2000). For instance, high achievers and intrinsically motivated students may not need as much instructional guidance, structure, and control (Reeve, 1996). External control and assistance can even work against learners with higher levels of autonomy and intellectual ability (Deci & Ryan, 1987; Ryan & Grolnick, 1986). This is now known as expertise reversal effect (Kalyuga, 2007; Sweller, Ayres, Kalyuga, & Chandler, 2003).

The Guided Approach in Microblogging-supported Learning Environments

Theories on social learning warrant the integration of social media such as microblogging tools to support learning. A social view of learning focuses on the notion that social interaction plays a fundamental role in stimulating learners to actively construct and organize knowledge in order to advance learners' cognitive development (Driscoll, 2000). Through communicating and connecting with others, learners become active participants in the learning community where they learn from one an-

other and contribute to the practices of a social community. Community of Inquiry theory, one of the modern theories of online learning, also stresses the paramount importance of engaging learners in social interaction and enabling learners to feel connected to other learners in the learning community (Garrison, Anderson, & Archer, 2000). As a tool that holds tremendous potential to promote opportunities for social learning, microblogging tools as one instance of social media have become increasingly popular in teaching and learning, rapidly gaining mounting attention from educational practitioners (Gao, Luo, & Zhang, 2012; Tang & Hew, 2017).

Recent research studies showed positive results of microblogging integration to enhance active engagement, social interaction and learning achievement. A wide variety of studies revealed evidence that Twitter, a popular microblogging application, could facilitate learner-content interaction (Domizi, 2013; Luo, 2015; Munoz, Pellegrini-Lafont, & Cramer, 2014), learner-learner interaction (Dunlap & Lowenthal, 2009; Ebner& Maurer, 2009; Hsu & Ching, 2012; Perifanou, 2009), and learner-instructor interaction (McArthur & Bostedo-Conway, 2012; Prestridge, 2014). Additionally, research suggested that Twitter played a critical role in improving students' academic achievement, such as course grades (Junco, Heiberger, & Loken, 2011; Kim et al., 2015; Van Vooren & Bess, 2013). In a most recent systematic review, scholars indicated a versatile nature of Twitter, concluding that educators around the world have used Twitter for communication, reflection, assessment, collaboration, and record keeping (Tang & Hew, 2017).

A few empirical research studies suggested that structure and guidance is necessary for collaborative microblogging-supported learning activities to be successful. For example, Luo, Dani, and Cheng (2016) posited that, using a Twitter-supported peer review activity as an instructional strategy, teachers could monitor discussions and keep up with student progress while students were posting peer view comments on Twitter. Twitter was also used in a collaborative writing project where students were asked to write a portion of text independently, build upon one another's work, and collectively keep a track record of their learning progress (Cano, 2012). In Junco et al.'s (2011) study, students were actively engaged in negotiating their plans for a group project, as well as using Twitter to facilitate group formation. It is worth noting that in any collaborative learning environments, the success of student learning is closely related to the degree to which instructors provide guidance and structure for group formation and interaction. Unstructured and unguided group interactions leave much room for unequal participation and some participants dominated or ignored the conversation, thus leading to negative social and cognitive processes (O'Donnell, Dansereau, Hall, & Rocklin, 1987; O'Donnell & O' Kelly, 1994). Except for expert learners and high achievers who possess advanced cognitive and social skills, structured and guided interaction tends to result in more significant learning outcomes (O'Donnell & O' Kelly, 1994).

Many current empirical studies examining the use of microblogging in traditional and formal educational settings have explicated the importance of providing guidance for microblogging-based activities (Dunlap & Lowenthal, 2009; Holotescu & Grosseck, 2009; Kruger-Ross, Waters, & Farwell, 2012; McWilliams, Hickey, Hines, Conner, & Bishop, 2010). Without instructional guidance, the amount of extraneous information on the web could easily overwhelm or distract learners, therefore impeding the effectiveness of social media integration to enhance learning (Dunlap & Lowenthal, 2009; Holotescu & Grosseck, 2009; Luo, 2015; Luo & Gao, 2012; Luo et al., 2016). Researchers stated that careful planning of microblogging activities that involve high levels of instructional guidance and structure can help eliminate distraction and ameliorate information overload (Holotescu & Grosseck, 2009; McWilliams et al., 2010). This finding is well aligned with early research on the guided approach, affirming that the merits of guided approach reside not only in the fact that it helps novice learners to acquire new knowledge, it also prevents students from digressing from the learning topic (de Jong, 1991). Extant research also suggests that students may find Twitter difficult and intimidating to use, given their unfamiliarity and lack of prior experience with its educational and academic use (Agherdien, 2011; Cohen & Duchan, 2012; Costa, Beham, Reinhardt, & Sillaots, 2008). All

of the above evidence in extant research makes a strong argument supporting the guided approach in microblogging-based learning environments.

Purpose of Study

Despite the overwhelming agreement on the importance of instructional guidance in microblogging-supported learning environments, very few studies have been done to examine the specificity of guidance, such as how to structure and support microblogging activities, as well as what types of guidance are appropriate in what learning contexts (Luo, 2015). In the current study, different variables, modes of learning (guided versus unguided), and types of guidance (social versus cognitive) were manipulated in a series of microblogging-supported collaborative learning tasks to examine to what extent and in which aspects instructional guidance affects the effectiveness and student perception of microblogging-supported learning. The following research questions guided this study:

1. How did students participate differently in a guided versus unguided mode?

2. How did students participate differently using cognitive versus social guidance approach?

3. How did students perceive the role of instructional guidance in the microblogging-supported learning environment?

METHODS

Participants

This study utilized a case study research design to examine the case via a multi-dimensional approach (Yin, 2009). This study was part of a larger multi-dimensional study (the author's dissertation) that investigated a Twitter integration (Luo, 2014). Participants consisted of 24 college students aged 19 to 22. They were education major students enrolled at a large, public state university located in mid-western United States, all of which were non-freshmen undergraduate students. Approximately 80% students identified themselves as an intermediate or advanced technology user, while less than 20% described themselves as an advanced beginner.

Context

The study took place in an undergraduate-level education course required by all education major students. It was an applied course that provided knowledge and skills for students to incorporate educational tools and applications to enhance teaching and learning. Students were involved in a format of blended learning where they met at three face-to-face in-class sessions and had to complete all remaining coursework online over a 14-week semester. The primary goal of the Twitter integration was to enhance student participation and engagement, as well as interaction among students and with the instructor. Twitter was introduced on the first day of the in-class meeting and carried on throughout the semester across various learning activities. Twitter was implemented as a backchannel to invite comment and feedback during lectures and presentations during the three face-to-face sessions (Weeks 1, 7, and 14). The three online activities supported by Twitter entailed (a) exploring Twitter hashtags pertinent to education subjects, (b) discussing and reflecting on weekly course topics, and (c) participating live in education-related, Twitter chats.

Operationalization of Instructional Guidance

In the current study, modes of learning (guided versus unguided) and types of guidance (social versus cognitive) were manipulated in a series of microblogging-supported collaborative learning activities in order to understand to what extent and in which aspects instructional guidance affects the student participation and perception of microblogging-supported learning.

Mode of learning

The instructor modified the mode of learning (guided versus unguided) in both online and face-to-face activities. In the face-to-face portion, backchannel communication was used to support both lecture and student presentations but at different times. The guided mode of learning was initially implemented in the first lecture where a microblogging-supported backchannel was created simultaneously and then altered to an unguided mode in the second lecture. For student presentations, modifications of the mode of learning followed the same string (See Table 1). During the online activities, the instructor modified the mode of learning every two weeks. In other words, for each online activity (hashtag exploration, topic discussions, and live chats), the instructor used a guided mode for the first two weeks and an unguided mode for the following two weeks (See Table 2).

Table 1. Mode of Learning in Face-to-face Meetings

Face-to-face	Week 1(Meeting 1)	Week 7(Meeting 2)	Week 14(Meeting 3)
Instructor lecture	Guided	Unguided	(not part of a meeting)
Student presentation	(not part of a meeting)	Guided	Unguided

Table 2. A Schedule of Online Activities with Twitter

Online meetings	Activities	Guided	Unguided	Social guidance	Cognitive guidance
Week 1	Hashtag Exploration	x			x
Week 2		x		x	
Week 3			x		
Week 4			x		
Week 5	Topic Discussion	x			x
Week 6		x		x	
Week 7			x		
Week 8			x		
Week 9	Live Chat	x			x
Week 10		x		x	
Week 11			x		
Week 12			x		

Type of guidance

Type of guidance (social versus cognitive) was modified in three of the online activities. Cognitive guidance involved either emphasizing the cognitive dimensions of the design task, such as providing instructional prompts for the task, breaking down the discussion topics, providing resources and pertinent information to facilitate the task. Contrastingly, social guidance focused on supporting group collaboration, such as developing cooperative and pro-social norms for conversation, encouraging students to socialize and help with one another on the learning tasks, etc. Sample instructional prompts are illustrated in Table 3 for each activity. Due to the limited time in face-to-face meetings,

the instructor did not differentiate social versus cognitive guidance. As weekly online activities were an on-going event that occurred on a regular basis within a longer time frame, type of guidance as a variable was modified to examine its potential influences on student learning. During the Live chat activity, however, the instructor was unable to distinguish social versus cognitive guidance as most of the conversations were social in nature and it would be too contrived not to engage in a social conversation. Therefore, the decision was to not to make this distinction in the analysis of Live chats activity.

Table 3. Sample Instructional Prompts

Activities	Cognitive	Social	Unguided
Hashtag Exploration	Here are a few chats you may to discover. #Edchat is about ... #Edtech is ... You can join #Edchat at XXpm, EST What do you mean by XXX?	Have you chatted yet? What did you find about those hashtags? Have you found anything interesting about those hashtags? Tweet the hashtags you found in this week!	Given a list of educational hashtags, find those that are interesting to you and tell me about what you find
Topics Discussion	What are the pedagogical use of XXX? What's your understanding of XXX? What are the benefits and constraints of XXX? How can these concepts XXX be applied in teaching and learning?	@XXX @XXX you guys are discussing topics of the same nature. Could you share your ideas more in detail with each other? @XXX you haven't posted anything yet about this week's discussion. What are your thoughts?	Discuss any interesting topic that we have covered in this week's content (posted materials and book chapters)
Live Chat	Provide the instructor's own direct opinion on the topic and guide students in-depth thoughts This topic XX relates to the concept XX we learn in class. What do you guys think? Here are more resources XXX about this topic. I agree with XXX on XXX I disagree with XXX on XXX because....	(Social greetings and conversations with students) Hello all! I am bringing in my own students/pre-service teachers to join #edchat! @XXX: you guys are having a heated discussion! @XXX: I haven't seen your tweets much. Any thoughts on this topic?	Not co-participate with students in live chats

Data Collection and Analysis

Data sources included student tweets, a summative survey, and semi-structured interviews. A texting mining tool, Twitter Archiving Google Spreadsheet (TAGS), powered by Google Sheets was set up to automatically capture tweets from Twitter's API as they were published by students via the designated class hashtag. An end-of-class survey was done to investigate students' perceptions of the Twitter integration. Two students did not participate in the end-of-class survey. The survey included a multi-

tude of Likert-scale, multiple-choice questions along with additional open-ended questions asking students to provide a written explanation of their quantitative ratings. The survey inquired students' demographic information, their pre-usage pattern and pre-perception of Twitter prior to the study, as well as perceived learning with Twitter in this class. The semi-structured interviews were conducted on a one-on-one basis at the researcher's office and 18 students volunteered to participate in the interviews. On average each of interview lasted 18 minutes. Only the data pertinent to instructional guidance were analyzed in this study.

To answer RQ1, students' tweets were analyzed in two dimensions: quantity of participation and relevancy of participation. When comparing participation in the guided versus unguided mode of learning, the following measures were used to indicate the quantity of participation: a) the total number of students who participated, b) the total number of tweets posted, and c) the total number of characters from every tweet. Student tweets were then coded as on-task or off-task tweets to indicate relevancy of participation. Tweets that reflected the learning content were coded as on-task, while the irrelevant tweets were coded as off-task. Off-task tweets were typically self-expression type of tweets that did not directly pertain to the instructional prompts (i.e., "Finally got my #xxxx Twitter set up! A little late...," "#xxxx First tweet in class wooooh!"). Note that relevancy of participation was not measured in the Live Chat activity as tweets that were previously considered off-task, such as tweets that exclusively reflected feelings and emotions of the moment, were considered relevant in the context of Live Chat activity as part of the live, social interaction. To answer RQ2, the same measures used to answer RQ1 were adopted again, but they were reused to compare the number within the discrete guided approaches, cognitive versus social guidance. As noted previously, only tweets in the Hashtag Exploration and Topic Discussion activity were analyzed to shed light on RQ2. To answer RQ3, students' responses to questions pertinent to instructional guidance from the survey and interview data were utilized to provide insights into their perceptions of the role of instructional guidance in microblogging-supported learning environments.

RESULTS

STUDENT PARTICIPATION

Quantity of participation

In general, students were apt to tweet more in guided environments in terms of quantity. Both frequency of tweeting as indicated by number of tweets and length of tweets as indicated by total characters, tended to outweigh the number in unguided environments (See Tables 4 and 5). The only exception was in the Week 1 Hashtags Exploration activity. Paramount among all potential reasons for this exception seemed to be characteristics of this student group. As teacher candidates, this group of students tended to be more cautious regarding technology adoption, requiring more time in evaluating and contemplating on the values of such technology rather than taking immediate action to use it. Therefore, in Week 1 the quantity of tweets produced by participants, both in online and face-to-face activities, was considerably less than all other weeks. This implication was reaffirmed in the survey and interview data.

Table 4. Quantity of Tweets Generated in Online Activities

Online setting	Activity	Guidance	# of participants	# of Posts	Total # of Characters
Week 1	Hashtag Exploration	Guided	9	16	1443
Week 2			17	35	3593
Week 3		Unguided	19	31	3070
Week 4			20	37	3861
Week 5	Discussing topics	Guided	20	54	6167
Week 6			16	55	6276
Week 7		Unguided	12	34	3688
Week 8			8	45	2181
Week 9-10	Live Chats	Guided	17	320	33338
Week 11-12		Unguided	14	221	22560

Table 5. Quantity of Tweets Generated in Face-to-face Activities

Face-to-face setting	Activity	Guidance	# of participants	# of Posts	Total # of Characters
Week 1	Lecture	Guided	17	21	1902
Week 7	Lecture	Unguided	16	30	2212
Week 7	Student Presentation	Guided	15	49	3873
Week 14	Student Presentation	Unguided	7	7	423

Relevancy of participation

Instructional guidance appeared to play a critical role in ensuring relevant participation of students. Looking at the proportion of off-task tweets, it is worth noting that when instructional guidance was present, the number of off-task tweets decreased dramatically with the exception of Week 1 (See Tables 6 and 7). Similar to the results regarding quantity of participation, in Week 1's face-to-face setting, students were all exhilarated to post their "first tweet" in the classroom, however these tweets were not considered pertinent to the learning task and therefore coded as off-task. Another exception was in week 7 when guest speakers gave a lecture. Even without instructional guidance, students only tweeted relevant topics as they were fully engaged by the learning topic provided by guest lecturers.

Table 6. Relevancy of Tweets in Online Settings

Face-to-face setting	Activity	Guidance	# of Off-task Tweets	% of Off-task Tweets
Week 1	Hashtag Exploration	Guided	5	23.8%
Week 2			0	0.0%
Week 3		Unguided	1	2.0%
Week 4			1	14.3%
Week 5	Topic Discussion	Guided	1	7.1%
Week 6			4	11.8%
Week 7		Unguided	6	19.4%
Week 8			3	8.1%

Table 7. Relevancy of Tweets in Face-to-face Settings

Face-to-face setting	Activity	Guidance	# of Off-task Tweets	% of Off-task Tweets
Week 1	Lecture	Guided	5	23.8%
Week 7	Lecture	Unguided	0	0.0%
Week 7	Student Presentation	Guided	1	2.0%
Week 14	Student Presentation	Unguided	1	14.3%

Cognitive versus Social Guidance

In terms of the comparison between cognitive and social guidance approach, the data showed a different pattern in the Hashtag Exploration as compared to the Topic Discussion activity (See Table 8). When students were exploring educational hashtags, using a cognitive guidance approach led to a lower number of tweets while a social guidance approach resulted in a greater number of tweets. Based on the data it seems that using a social guidance approach is more conducive to generating a higher volume of participation; however, Week 1's lower participation rate may again have been attributed to students' initial hesitance to participate. In the Topic Discussion activity, the variation in type of guidance did not seem to yield a difference in quantity of participation. When it comes to relevancy of participation, differences between cognitive and social guidance did not seem to be prominent in this string of analysis. Overall, type of guidance did not seem to make a significant difference in determining students' participation.

Table 8. A Comparison between the Cognitive versus Social Guidance Approach

Online setting	Activity	Type of Guidance	# of Participants	# of Posts	Total # of Characters	Off-task tweets
Week 1	Hashtag Exploration	Cognitive	9	16	1443	1(7.1%)
Week 2		Social	17	35	3593	4(11.8%)
Week 5	Topic Discussion	Cognitive	20	54	6167	1(1.9%)
Week 6		Social	16	55	6276	0(0.0%)

Student Perceptions of Instructional Guidance

The survey data showed that when asked whether the tweeting activity needed to be guided, 32% of the participants believed that it should, more than half (55%) believed it should not, and 14% believed it should be a mixture of both, such as being guided initially and later moving towards student independence. It is evident that their preference over guidance largely relies on their familiarity and comfort level with Twitter. Many advanced Twitter users agreed that Twitter is easy-to-use enough that they could have been given more freedom to tweet, which may have bred creativity and higher interaction. As one student put, "It should not be guided because we had a good time completing the Twitter discussions and hashtag searches on our own." Less Twitter-comfortable students acknowledged the importance of guidance, especially in the initial stage, namely the hashtag exploration and discussion activities. They commented that the online presence of the instructor was critical to them, because "It is hard to understand Twitter at first so it was nice to have someone helping" and "it was helpful to have someone's example to follow." Five students proposed the progressive model of guidance in which guidance can be removed when the familiarity and comfort level reached a certain stage. As one student stated, "It is important to have some guidance due to Twitter being such a large engine, but freedom allows for students to explore their own interests later and be creative." Overall, the majority of students valued instructional guidance as they believed that students could also wander off-task or drift if instructional guidance is absent.

The interview data provided corroborating evidence again suggesting the importance of instructional guidance as perceived by students. All 18 students favored instructional guidance to some degree. Eight students showed a preference towards full guidance, while the remainder preferred a progressive and contingent mode of guidance depending on types of activities and stages of implementation. The vast majority of students stated that they would not have tweeted vigorously had instructional guidance not been in place. The interview data echoed the survey data, suggesting that novice Twitter users tended to prefer detailed, step-by-step types of *how-to* instructions. Students also perceived various values of instructor's presence when co-participating in the live chats. They enjoyed and appreciated seeing the instructor's own tweets on Twitter because "it feels like you are there," making them feel more safe and comfortable, which is especially beneficial for first-timers. One student commented, "You know you have someone to turn to if you are in trouble." Students also remarked that the instructor's tweets served as a good model of tweeting behavior so that they knew what was expected as they were engaged in the conversations simultaneously.

Ten students from the interviews noted that the three online activities provided a nicely scaffolded learning experience where one builds on top of the other. The Hashtag Exploration activity served as "a stepping stone into the other activities." Without a rich understanding of the hashtags, students would not have been able to participate properly in discussion activities, nor would have been able to follow the fast pace of synchronous live chats. Students commented that their engagement in exploring hashtags and discussions to a large degree had prepared them for joining the live chats. Four students also believed that they would have liked a mixture of guided and unguided portions of the

tweeting activities. Students also stated that the type and amount of guidance could be varied depending on the different goals and objectives of the activity, as well as students' familiarity and comfort level. For example, exploring hashtags may be more suited to have less guidance than live chats as it is rather simplistic and many students are familiar with it.

DISCUSSION

As social media have gained mounting traction in education, instructional heuristics and strategies that effectively guide, monitor, and optimize their utility in varying learning contexts become increasingly pertinent (Davis, Deil-Amen, Rios-Aguilar, & González Canché, 2013). In the light of such vision, this current study aims to tentatively answer the question of what differences instructional guidance could make to the results of microblogging-supported learning. The overall results from analyzing student tweets suggest that compared to an unguided mode, student participation in terms of volume and relevancy in the guided environments was relatively higher. It is largely implied that as students' knowledge, skills, and comfort level with Twitter increased, a fading effect on the importance of instructional guidance was observed. Results from survey and interview data concur with these overall results, suggesting a critical role of instructional guidance perceived by students, especially for novel Twitter users.

These overall findings can be further explicated from three perspectives. First, overall instructional guidance is conducive to eliminating digression from instructional content and thus reduces the extraneous cognitive load. This result was particularly evident when comparing the participation and relevancy of student tweets in guided versus non-guided environments. Despite the fact that microblogging is a relatively new media that has been understudied regarding the efficacy of instructional guidance, this study data revealed that putting instructional guidance in place may lead to increased student learning in microblogging-supported environments. These findings are in conformity with seminal work on human cognitive architecture (Sweller, Ayres, & Kalyuga, 2011) and principles of multimedia learning (Mayer, 2004), as well as specific empirical studies suggesting the critical role of instructional guidance to reduce irrelevant noise information on an open microblogging platform (Dunlap & Lowenthal, 2009; Holotescu & Grosseck, 2009; Luo, 2015; Luo & Gao, 2012).

Second, the data shows an incongruent result regarding the effects of type of guidance between a cognitive versus social guidance approach. One speculation is that the difference between these two types of guidance approaches may not have been operationalized in a sufficiently salient manner to result in a noticeable difference in student participation. It may have been that both social and cognitive approaches are needed to tailor to different learners' needs and learning contexts, as prior research often suggested incongruent results in different learning tasks and environments (Zahn et al., 2012). Due to many other potential factors in place that could potentially influence student learning, no conclusive remarks can be made regarding the superiority of either type of guidance approach. Future researchers should continue to develop robust research methodologies to seek ways to better operationalize this variable and strive to understand its effect.

The study also offers several recommendations regarding how to use microblogging in educational practice. First, educators and practitioners should consider providing guidance to students as they integrate microblogging into formal educational settings. This study, along with many others in the education literature, confirmed the critical role of instructional guidance and reassured its necessity. Meanwhile, it is also implied that students' prior knowledge and skills with Twitter's educative use largely determines their perceived value as well as the effects of instructional guidance. This result can be drawn from the analysis of tweets in the later live chats sessions as higher-level participation still occurred in live chats even without instructional guidance. The level of guidance needed may largely rely on students' prior experience and perception. Students with extensive Twitter experience may perceive instructional guidance less useful. These findings appear to support the expert reversal effect (Kyun, Kalyuga, & Sweller, 2013; Oksa, Kalyuga, & Chandler, 2010; Reisslein, Atkinson, Seeling, & Reisslein, 2006) suggesting a lowering degree of guidance needed as learners move towards

task mastery. To iterate, it is important to examine learners' prior knowledge and comfort level with these tools and tailor the design of instructional activities to their attributes. It is also vital to monitor student progress, adjust the type, amount of guidance, and scaffolding provided as they progress, and then eventually remove the scaffolding until students can demonstrate that they can perform the task successfully without assistance (Lipscomb, Swanson, & West, 2004).

CONCLUSION

In response to the call for improving social media learning environments underscored in contemporary education (Greenhow et al., 2009), the current case study took an initial step aiming to enhance the understanding of the role instructional guidance plays in social media-supported learning environments. The type of social media examined in this study was microblogging. Congruent with results from prior research, this study suggests that with instructor facilitation students succeeded in becoming engaged within a highly participatory and interactive learning experience with the utilization of a variety of tasks and activities (Dunlap & Lowenthal, 2009; Holotescu & Grosseck, 2009; Luo, 2015; Luo & Gao, 2012). Similar to previous studies (i.e., Luo, 2015; Luo et al., 2017), the current study provides new evidence suggesting the existence of instructional guidance could make a difference in whether or not students would stay on-task in the microblogging-supported learning environments. This study again indicates that students' perspectives of social media tools rely heavily on what instructors do with the tools and how the instructional activities are structured and supported. Meanwhile, students' perception of usefulness of instructional guidance is closely related to their own pre-perceptions and prior experiences with the social media tools (Agrifoglio, Black, & Metallo, 2010; Barnes & Böhringer, 2011; Luo et al., 2016). The above results bring up-to-date empirical evidence to the existing findings in the extant literature on microblogging tools. Additionally, this study enhances current literature findings by attempting to examine the effects of social versus cognitive guidance on student participation for the first time. However, in this study variations in type of guidance (social versus cognitive) did not seem to result in a difference in students' participation, likely due to the other confounding factors in research operationalization.

Given the limitations of the study, the following directions for future research are recommended. First, as this study only examines student participation and perception in a particular setting, the results are limited in the sense that it may only be applicable to other populations and settings with similar traits. Future replication studies in alternative settings, with a larger sample size, and different populations will certainly provide further insights on the effects of instructional guidance in microblogging-based learning. Second, this study only used descriptive statistical analysis to examine students' tweets. Using inferential statistics collected from a large sample would improve the rigor and generalizability of such results. Alternative coding methods may also shed light on differences in student interaction with regard to content diversity and depth of learning when analyzing the tweets. Third, methodologically this study used the program TAGS that captured all the tweets with a course hashtag and equated these as the entire dataset to examine student participation, while some of the untagged tweets might have been omitted in the data. How to fully capture the entire course of tweeting and how to avoid the missing data could be challenging to researchers. Advanced data collection techniques may be explored to ascertain the completeness of data collection. Additionally, how to accurately and properly operationalize cognitive versus social guidance in microblogging-supported learning continues to pose a challenge to researchers. Endeavors to overcome these challenges and advance this strand of methodology are worth pursuing as well.

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