Cultural institutions are using social media, like Twitter, to promote digitized primary source collections to teachers. With so many resources dedicated to social media outreach, it is necessary to examine the effectiveness of cultural institutions’ outreach to teachers. This study examines the Twitter messages produced by three U.S. cultural institutions and identifies the relationship between message characteristics and the perceived value of the messages by K-12 teachers. A content analysis of tweets selected from the Twitter timelines of the Smithsonian Institution, National Archives and Records Administration, and the National Endowment of Humanities education outreach departments identified the types of content produced by these cultural institutions. Categories that emerged from the content analysis were used to develop a survey to explore the value of the tweets to teachers. This study provides insight into the use of Twitter messages for outreach to teachers and offers recommendations for improving Twitter outreach to teachers.
U.S. CULTURAL INSTITUTIONS' TWITTER OUTREACH TO K-12 TEACHERS

by
Sara E. Suiter

A Master’s paper submitted to the faculty of the School of Information and Library Science of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Library Science.

Chapel Hill, North Carolina
April 2013

Approved by

_______________________________________
Frederic Stutzman
Table of Contents

Introduction ......................................................................................................................... 3
Social media technology ........................................................................................................ 3
Twitter ................................................................................................................................. 4

Purpose .................................................................................................................................. 4

Literature Review .................................................................................................................. 5
Characterizations of Twitter content ....................................................................................... 6
Characterizations of Twitter communication styles ............................................................... 7
Libraries and social media ...................................................................................................... 8
Federal government and social media .................................................................................... 9
Teachers and social media ................................................................................................... 9
Evaluating value of Twitter content ...................................................................................... 10

Research Questions .............................................................................................................. 11

Methods ............................................................................................................................... 12
1. Content Analysis .............................................................................................................. 12
1.1 Content Analysis Dataset ............................................................................................... 12
   Table 1.1 Twitter account statistics at time of download .................................................. 13
1.2 Coding Protocol Development ....................................................................................... 13
   Table 1.2 Twitter message content categories ................................................................. 14
2. Survey ............................................................................................................................. 14
2.1 Survey Sample ............................................................................................................... 15
2.2 Survey Design ............................................................................................................... 15

Results ................................................................................................................................... 16
Survey sample descriptives ................................................................................................. 16
   Table 1.3 Descriptive statistics about survey respondents (percentages) ......................... 17
Finding 1: Teachers’ professional uses of Twitter ............................................................... 17
   Table 1.4 Twitter users by grade-level ............................................................................ 18
   Figure 1. Twitter use by grade-level ............................................................................... 20
   Table 1.5 Professional uses of Twitter by grade-level (percentages) ............................... 21
Finding 2: Categories of content and their value to teachers ................................................ 21
Finding 2.1 Value of categories of content........................................................................... 22
   Value ratings of categories before viewing example tweet ........................................... 22
   Value ratings of categories after viewing example tweet ............................................. 23
   Table 1.6 Category value: General & value when represented by tweets ....................... 24
   Categories of content: Comparison .............................................................................. 24
   Figure 2. Comparison of mean value rating for categories of content ............................ 25
Finding 2.2 Likelihood of taking action .............................................................................. 26
   Table 1.7 Comparison of mean value ratings for categories and likelihood of taking action 26
   Table 1.8 Relationship between category value and action ......................................... 27
Finding 2.3 Categories represented in institutions’ Twitter feeds ......................................... 27
   Table 1.9 Comparison of categories present in institutions’ Twitter content .................... 28
Finding 3: Structural characteristics and their impact on value ................................................................. 28
Table 1.10 Structural component value ratings .................................................................................................. 29
Table 1.11 Structural components present in institutions’ Twitter content ....................................................... 30
Structural component: Context ......................................................................................................................... 30
Structural component: Hashtags ....................................................................................................................... 30
Structural component: Questions ...................................................................................................................... 31
Structural component: URLs ............................................................................................................................ 31
Structural component: Contextual replies ......................................................................................................... 31
Figure 3a. Example of good reply tweet ............................................................................................................ 32
Figure 3b. Example of bad reply tweet .............................................................................................................. 32
Discussion .......................................................................................................................................................... 32
Recommendation 1. Add context to teaching resources tweets ............................................................ 35
Recommendation 2. Tweet about teaching strategies .................................................................................. 35
Recommendation 3. Add context to replies, or reply privately .............................................................. 36
Conclusion ......................................................................................................................................................... 36
Limitations .......................................................................................................................................................... 36
Notes ................................................................................................................................................................. 38
References ........................................................................................................................................................ 40
Appendix A – Downloading Tweets Using the Twitter API .............................................................................. 42
Appendix B - Coding Protocol ........................................................................................................................ 43
Appendix C – Survey Questions ....................................................................................................................... 46
Appendix D – Tweet Screenshots ................................................................................................................... 52
Table 1.12 Significance between category value ratings when represented by tweets ............................... 59
**Introduction**

Libraries, archives, and museums are digitizing collections and making them available to the public on the web. Increasingly, grants that fund digitization projects require a statement of impact. The benefits of digitized collections for K-12 teachers and students, including the ability to incorporate rare collections into everyday classroom teaching, are often highlighted as potential areas of impact. Institutions focus on outreach to K-12 teachers in order to promote digitized collections and encourage their use in the classroom.

Libraries and cultural institutions are turning to social media, like Twitter, as a forum for promoting the use of digitized primary sources to users, like K-12 teachers (Schrier, 2011, p. 1). Some institutions tweet the URLs for new digitized primary sources or discuss with teachers, via Twitter, strategies for teaching with primary sources. With so many institutional resources dedicated to the development and dissemination of content through social media, it is necessary to examine the effectiveness of current Twitter outreach efforts to teachers.

**Social media technology**

Social media technologies are online tools that enable social interaction, communication, and the sharing of content like photos, videos, and text-based messages (Bertot, Jaeger, & Hansen, 2011, p. 30). The term social media refers to a wide range of web-based services that differ in structure and function including how interactions take place, the speed of interactions, and how content is generated and stored. These include
blogs and microblogs (e.g. Twitter), photo and video sharing platforms (e.g. Flickr), and social networking services, like Facebook (Bertot, Jaeger, & Hansen, 2011, p. 30).

Social media technologies allow users to collaborate to build user-generated information resources and share insights and expertise through discussion. According to a Nielsen (2011) report, U.S. Internet users spent almost a quarter of their time on the Internet on blogs and social networking websites.

Twitter

Twitter is a microblogging platform, to which users can post short 140-character messages, or tweets. A user’s tweets are displayed in reverse chronological order on the user’s Twitter page, or timeline (Naaman, Boase, & Lai, 2010, p. 190). Twitter users connect by following other users of interest, called “friends.” Naaman et al. (2010) describe Twitter’s network of contacts as asymmetric because if one user, @ladygaga, follows another user, @BarackObama, President Obama does not have to follow Lady Gaga. Unless users have set privacy settings to limit viewing of their posts, or tweets, when users tweet, their messages can be viewed by anyone. Naaman et al. (2010) explain that, “Users consume messages mostly by viewing a core page showing a stream of the latest messages from all of their friends.” Since Twitter was launched in July 2006 it has grown to over 500 million registered users worldwide (O’Carroll, 2012).

Purpose

The purpose of this study is to examine the categories of content and structural components of Twitter messages produced by U.S. cultural institutions and identify how these message characteristics affect how teachers rate the value of the message. In the first phase, a content analysis of tweets from the education outreach departments of the
Smithsonian Institution, National Archives and Records Administration (NARA), and the National Endowment of Humanities (NEH) identified the types of content used by these cultural institutions in their outreach to K-12 teachers. In the second phase, themes from the content analysis were used to develop a survey for teachers.

Twitter was selected from among other social media tools because it is the only social media platform on which all three institutions maintain a presence directly focused on outreach to K-12 teachers. The content analysis method enables critical examination and categorization of tweets from the three institutions, which is necessary for understanding the range of Twitter content being promoted to teachers. A survey of teachers, with questions based on the categories that emerged from the content analysis, provides insight into how they value certain content categories.

The content of messages posted to Twitter is defined as the type of information shared and the user’s purpose in sharing the information. The coding protocol provides examples of the categories of content that emerged from the downloaded tweets. For example, a category that emerged from the research of Naaman et al. (2010), “Information Sharing,” is defined as messages that link to articles or other resources. The value of Twitter messages is defined as the degree to which K-12 teachers pay attention to and take action as a result of the content of the Twitter message. For example, do teachers follow hyperlinks to digitized resources, or ignore these Twitter messages?

**Literature Review**

Since the launch of Twitter in July 2006, researchers from disciplines including Communications, English, and Information Science & Technology have researched topics like the content of Twitter messages, Twitter’s use as a tool for collaboration, and
the types of interactions taking place on the platform. First, the literature review presents several studies that used content analysis methods to categorize the content and communication styles of Twitter messages. Then, we examine the use of Twitter by cultural institutions, government agencies and teachers. Finally, we highlight one of the few studies that attempt to examine the value of different types of Twitter content.

**Characterizations of Twitter content**

Early studies of Twitter focused on why and how people used microblogging tools, particularly the type of content generated by users. Java, Song, Finin, and Tseng (2007) published one of the earliest studies of peoples’ use of Twitter as a microblogging tool, which analyzed the content of tweets downloaded from Twitter’s public timeline. Java et al. found that the main uses of Twitter included daily chatter, conversations, sharing information, and reporting news (Java, Song, Finin, & Tseng, 2007).¹ A flaw in Java et al. centers on the categorization of tweets as conversations by the presence of an @ sign. This does not take into consideration other uses of the @ sign or require that a conversation involve two-way communication (Java, Song, Finin, & Tseng, 2007).

Honeycutt et al. (2009) built upon the Java et al. definition of a conversation, specifying that a conversation must include a minimum of one initiation and one response (Honeycutt & Herring, 2009, p. 4).

Naaman, Boase, and Lai (2010) expand on the research of Java et al. using content analysis methods to develop content-based categorization of types of messages posted to Twitter in order to examine the social activity and patterns of communication on Twitter. Four dominant categories of content (out of nine total) emerged: information
sharing, opinions/complaints, statements and random thoughts, and “me now” statements. “Me now” statements had the greatest frequency (Naaman, Boase, & Lai, 2010, p. 191).²

In addition to categorizing types of content, both studies identify types of users on Twitter. Java et al. (2007) identified three types of Twitter users: information sources, friends, and information seekers.³ It is possible for a user to play different roles in different communities. Naaman et al. (2010) identified two types of Twitter users: “Meformers” (80%) and informers (20%). Meformers post messages about themselves or their thoughts, while informers post messages that are informational in nature (Naaman, Boase, & Lai, 2010, p.192).

**Characterizations of Twitter communication styles**

In addition to characterizing the type of content of Twitter messages, researchers have taken several approaches to analyzing the communication style used in Twitter messages. Honeycutt and Herring (2009) focus on the functions and uses of the @ sign in Twitter messages to determine how people are using Twitter and how well Twitter supports user-to-user exchanges. Analyzing a random sample of tweets, researchers found that the @ sign was most frequently used to direct a tweet at a particular user, followed by its use to refer to another user. The study also determined that the content of tweets with the @ sign is more interactive than messages without the @ sign, which tend to be more self-focused (Honeycutt & Herring, 2009).

Baumgarten (2011) and Waters & Jamal (2011) each applied a different communications theory to examine the communication styles of nonprofit organizations on Twitter. Baumgarten (2011) examined nonprofit organizations’ use of dialogic principles in their Twitter messages. Dialogic communication is defined as, “a
communicative relationship based on two-way interaction (Baumgarten, p. 6). Two dialogic principles were found in a majority of tweets from nonprofit organizations: the facilitation of dialogic loop and conservation of visitors (Baumgarten, p. 10).

In contrast, Waters et al. (2011) applied four public relations models to tweets from top nonprofit organizations and found that the one-way public information model was the most common model used in communication. Among the two-way public relations models, two-way asymmetric dialogue was more prevalent than two-way symmetric dialogue (Waters & Jamal, 2011). It is interesting that Baumgarten (2011) found that the majority of tweets from her sample engaged in dialogic communication, while Waters et al. (2011) found that nonprofit organizations were largely employing one-way communication techniques.

**Libraries and social media**

An examination of literature about social media use in libraries and archives returned many articles based on the personal experiences, observations, and opinions of librarians and archivists using social media to promote their digitized collections. Opinion pieces and personal accounts are useful for understanding how libraries and archives view their relationship with social media technologies, like Twitter. In one opinion piece, the authors encourage librarians to look at other industries for applications of Twitter and suggest that Twitter in the academic library setting should move beyond one-way marketing messages to building communities and delivering reference services (Gunton & Davis, 2012).

Stuart (2010) provides one of the few formal studies examining libraries’ use of Twitter. Stuart finds that many libraries are failing to maintain an active presence, with
only 30% of 433 institutional library accounts examined averaging one post per day. Furthermore, Stuart finds that libraries are using Twitter primarily for broadcasting news and information, rather than building relationships through conversations with users (Stuart, 2010, p. 47). Additional evidence-based research is needed to understand library and cultural institutions’ use of social media, particularly the effects of social media outreach.

**Federal government and social media**

Similar to library, archives, and museum use of social media, the federal government has embraced social media, particularly Twitter, to connect with the public. Potential uses for social media by the federal government include: as a forum for democratic participation, to shape the design and delivery of services, and for crowdsourcing solutions to problems from the general public (Bertot, Jaeger, & Hansen, 2011). In one study, the authors randomly selected and analyzed sixty official federal government Twitter accounts in order to determine the application of four public relations theories to official federal government communications via Twitter (Waters & Williams, 2011). The authors assumed that the majority of tweets would be informational, one-way communications; however, their research revealed a higher-than-expected use of symmetry (two-way communication) used in conjunction with one-way informational tweets (Waters & Williams, 2011).

**Teachers and social media**

With attempts by libraries, archives, museums, and federal cultural institutions to use social media for outreach to K-12 teachers, it is necessary to examine how teachers are using Twitter. There is growing research on teachers’ use of social media, particularly
Twitter, for professional development. A Pew Research Center report (2013) that examined teachers’ use of technology found that the percent of teachers using Twitter (26%) was higher than national figures for all U.S. adults – 16% of adult Internet users and 14% of U.S. adults ages 18+ are using Twitter (Purcell, Heaps, Buchanan, & Friedrich, 2013). Another article describes the importance of the connections formed among education professionals on Twitter, “Those connections can break the sense of professional isolation that many teachers feel within the walls of their own schools while reinvigorating their lesson plans by exposing them to a daily global idea exchange (Cooke, 2012).”

Teachers’ use of Twitter is further described in a recent study that found that teachers use Twitter to connect with like-minded educators to share experiences from their own classroom practice, practical tips, and discussions of education policy. Interestingly, the study also found that teachers on Twitter share the ideas and strategies gathered from Twitter with teachers in their local community, serving as bridges (Forte, Humphreys, & Park, 2012). This study provides insight into how teachers engage using Twitter and validates the importance of studying efforts by U.S. cultural institutions to engage with teachers and the effectiveness of current efforts.

**Evaluating value of Twitter content**

Much of the research focuses on characteristics of Twitter messages and users; however, there have not been many attempts to understand the types of content users do and do not value, and why. Andre, Bernstein, and Luther (2012) designed the website *Who Gives a Tweet (WGAT)* to engage users in rating tweets and study the question of Twitter content value. Andre et al. selected for analysis a sample of 4,220 ratings from a
total of 43,738 rated tweets. WGAT users were asked to rate ten tweets as *Worth Reading*, *OK*, or *Not Worth Reading*. In addition to user ratings, the researchers conducted a content analysis, applying categories adapted from Naaman (2010) to categorize the type and content of the tweets (André, Bernstein, & Luther, 2012). Rating showed that the most-liked categories were questions to followers, information sharing, and self-promotion; the most disliked categories were presence maintenance, conversation, and “me now” messages. Thirty-six percent of the tweets were rated as *Worth Reading*, 25% rated as *Not Worth Reading*, and 36% *OK* (André, Bernstein, & Luther, 2012).

It is interesting that Java et al. (2007) and Naaman et al. (2010) categorized the majority of Twitter users as “Me Formers,” when, according to Andre et al. (2012), these types of tweets are the least worth reading. This might illustrate a shift away from Twitter’s intended use for answering the question, “What are you doing right now?” towards use by institutions to build relationships with stakeholders through information sharing and two-way communication.

**Research Questions**

This study will attempt to identify the types of Twitter content valued by K-12 teachers with the goal of providing guidance to U.S. cultural institutions as they engage in social media outreach. This study addresses the following research questions:

RQ1: Do K-12 teachers use Twitter to find teaching or professional development resources?

RQ2: Does the content category of a tweet affect how teachers rate the value of the message?
RQ3: What categories of content characterize U.S. cultural institutions’ Twitter messages to teachers?

RQ4: Do the components of a tweet affect how teachers rate the value of the message?

RQ5: What tweet components do U.S. cultural institutions include in Twitter messages to teachers?

**Methods**

Two sets of data were gathered and analyzed in order to understand how the content and structural components of tweets affect how teachers rate the value of the messages. First, we conducted a descriptive content analysis; qualitatively categorizing Twitter messages downloaded using the Twitter API. Second, we developed a quantitative survey for teachers based on the data gathered in the content analysis. This section begins with a description of the dataset and coding process used in the content analysis, and then describes the survey sample and the process of survey development.

1. **Content Analysis**

In the first phase of the study, descriptive content analysis methods were used to identify the categories of content (RQ3) and tweet components (RQ5) that characterize the Twitter messages of three U.S. cultural institutions.

1.1 **Content Analysis Dataset**

The content analysis dataset is comprised of tweets downloaded from the Smithsonian Institution, National Archives (NARA), and National Endowment for Humanities (NEH) education Twitter account timelines using the Twitter API. Twitter timelines display each Twitter users’ 3,200 most-recent tweets in reverse chronological order. When the tweets were downloaded on October 23, 2012, the Smithsonian
Education (@SmithsonianEdu) and NARA (@DocsTeach) accounts had tweeted 691 and 978 times, respectively. Therefore, all of the tweets from these two institutions’ Twitter timelines were downloaded. Comparatively, the NEH account (@EDSITEment) had tweeted 11,076 times at the time of download, so only the 3,237 most-recent tweets were downloaded as part of the sampling frame. Table 1.1 provides data for the three Twitter accounts at the time of download. A sample of one hundred tweets was randomly selected from each organization’s Twitter timeline using simple random sampling.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Date coverage of downloaded tweets</th>
<th># of tweets downloaded</th>
<th>Total # of tweets at time of download</th>
<th># of Followers at time of download</th>
<th># Following at time of download</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smithsonian Education @SmithsonianEdu</td>
<td>11/13/2009 – 10/23/2012</td>
<td>691</td>
<td>691</td>
<td>5,910</td>
<td>6,475</td>
</tr>
<tr>
<td>National Archives @DocsTeach</td>
<td>8/26/2010 – 10/23/2012</td>
<td>978</td>
<td>978</td>
<td>1,611</td>
<td>52</td>
</tr>
<tr>
<td>National Endowment for Humanities @EDSITEment</td>
<td>2/9/2012 – 10/23/2012</td>
<td>3,237</td>
<td>11,076</td>
<td>2,498</td>
<td>725</td>
</tr>
</tbody>
</table>

1.2 Coding Protocol Development

A coding protocol was developed and used to identify and analyze the categories of content (RQ3) and structural components (RQ5) of three hundred randomly selected tweets (100 per institution). Developed to ensure consistency among coders, the coding protocol includes definitions and examples for each category of content and structural component. The list of content categories and structural components was developed using a grounded theory approach, which allowed them to emerge from the data. Many of the categories and characteristics that emerged align with themes found in existing
literature (Forte et al., 2012; Java et al., 2007; Naaman et al., 2010). Table 1.2 includes an abbreviated list of the content categories.

<table>
<thead>
<tr>
<th>Code</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1= Teaching resources</td>
<td>Tools, primary sources, activities, lesson plans</td>
</tr>
<tr>
<td>2= Teaching strategies</td>
<td>“How to…” information for teachers, e.g., ideas/methods/strategies for adapting lessons for English Language Learners.</td>
</tr>
<tr>
<td>3= Education related news</td>
<td>Links to background information or education-related stories or news</td>
</tr>
<tr>
<td>4= Education policy</td>
<td>Local, national, global educational policies or laws, educational reforms</td>
</tr>
<tr>
<td>5= Event announcements</td>
<td>Information about upcoming events</td>
</tr>
<tr>
<td>6= Requests</td>
<td>Requests for response, advice, or action</td>
</tr>
<tr>
<td>7= Replies</td>
<td>Generally characterized by the “@” symbol which is being used to reply to another person/organization’s tweet</td>
</tr>
<tr>
<td>8= Self-promotion</td>
<td>Facts, trivia, status updates</td>
</tr>
</tbody>
</table>

To maximize reliability, two coders independently classified each of the three hundred tweets using the coding protocol. According to Riffe, et al., “Reliability in content analysis is defined as agreement among coders about categorizing content” (Riffe, D., Lacy, S., Fico, F. G., 2005, p. 123). Due to the nature of the messages, the coders were allowed to assign up to two content categories to each tweet. The codes assigned to each tweet were compared and the coders discussed and resolved discrepancies.

2. Survey

In the second phase of the study, a survey was designed to understand teachers’ professional uses of Twitter (RQ1) and identify the categories of content (RQ2) and
structural components of tweets (RQ4) that teachers find most valuable when finding resources for classroom teaching or professional development.

2.1 Survey Sample

The survey was distributed to three distinct groups of teachers. The first group included teachers who have participated in the Library of Congress’ *Teaching with Primary Sources* (TPS) professional development. Permission was obtained to post the survey to Yahoo groups created for each Library of Congress TPS professional development session, reaching approximately 200 former TPS participants. Permission was also obtained to distribute the survey via email to the twenty-two teachers in the Library of Congress’ TPS mentor network. Finally, the survey was sent via email to approximately 980 teachers subscribed to the #sschat Ning.11

The survey was sent to approximately 1,200 teachers, who were invited to share the survey via email with their professional learning networks and colleagues. It is not possible to provide a response rate because the total number of teachers who had access to the survey link is not known. The survey had 201 participants, with thirty-nine additional participants starting, but not completing the survey.

2.2 Survey Design

The survey questions were based on the content categories and structural components that emerged during the content analysis (Table 1.2). The survey was designed using Qualtrics. Two field pretests were conducted to determine the average completion time, ensure question clarity, and test survey functionality. Minor revisions were made after each field pretest. The final survey had an estimated completion time of ten minutes. The survey was distributed to all three participant groups on Tuesday,
February 12, 2013 with a reminder email sent on Tuesday, February 19, 2013. A final reminder was sent on Thursday, February 28, 2013 letting potential participants know that the survey would close at midnight on Sunday, March 3, 2013. To improve the response rate, respondents had the option to enter a drawing for one of four $50 Visa gift cards.

**Results**

The main objective of this study was to identify the categories of Twitter content perceived as most valuable to teachers (RQ2, RQ3). A secondary goal was to identify certain structural components of tweets that, when present, increase a tweet’s value to teachers (RQ4, RQ5). Several findings are presented that address the research questions identified in this study.

**Survey sample descriptives**

As Table 1.3 reports, the survey sample represents a diverse group of education professionals. Approximately sixty-four percent of the survey respondents were classroom teachers, 20.3% school librarians, and the remaining 15.9% were content specialists, department heads, school administrators, and educational consultants. All grade levels from pre-kindergarten through graduate school were represented, with greatest representation among high school teachers (45.6%), followed by middle school (30%) and elementary teachers (17.9%). Undergraduate and graduate education professors and educational consultants made up the remaining 6.6% of respondents. The greatest percent of respondents work in public schools (80.6%) and forty-seven percent of respondents teach in suburban schools. The average number of years of teaching
experience was 13.78 years, and 55.6% percent of respondents have more than eleven years of teaching experience.

Table 1.3 Descriptive statistics about survey respondents (percentages)

<table>
<thead>
<tr>
<th>Survey respondents (n=201)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary job responsibility</strong></td>
</tr>
<tr>
<td>Classroom teaching</td>
</tr>
<tr>
<td>Administrative</td>
</tr>
<tr>
<td>Librarian</td>
</tr>
<tr>
<td>Content specialist</td>
</tr>
<tr>
<td>Department head</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td><strong>Grade-level</strong></td>
</tr>
<tr>
<td>Elementary (PreK-5)</td>
</tr>
<tr>
<td>Middle school (6-8)</td>
</tr>
<tr>
<td>High school (9-12)</td>
</tr>
<tr>
<td>Higher Education</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td><strong>Years of experience</strong></td>
</tr>
<tr>
<td>0-4 years</td>
</tr>
<tr>
<td>5-10 years</td>
</tr>
<tr>
<td>11+ years</td>
</tr>
<tr>
<td><strong>Type of school</strong></td>
</tr>
<tr>
<td>Public</td>
</tr>
<tr>
<td>Private</td>
</tr>
<tr>
<td>Religious</td>
</tr>
<tr>
<td>Homeschool</td>
</tr>
<tr>
<td>College/University</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>Urban</td>
</tr>
<tr>
<td>Suburban</td>
</tr>
<tr>
<td>Rural</td>
</tr>
</tbody>
</table>

Finding 1: Teachers’ professional uses of Twitter

To understand teachers’ use of Twitter for finding teaching or professional development resources (RQ1), the first section of the survey asked teachers several questions regarding their use of Twitter for professional purposes. First, respondents were
asked whether they have a Twitter account. Those that answered “no” skipped to the second section of the survey, and respondents who answered “yes” were asked seven questions to gather more information about their use of Twitter.

Respondents were asked whether they use Twitter for professional, personal, or both professional and personal purposes. Respondents were then asked to check all of their professional uses of Twitter including: locating teaching resources, learning new teaching strategies, giving/receiving advice on handling issues in the classroom, and participating in discussions with other teachers or education professionals. To better understand respondents’ use of Twitter, other questions included how many times they have tweeted and checked Twitter in the past month, whether respondents follow educational organizations on Twitter, and how many people and educational organizations they follow.

Approximately 80% of respondents reported having a Twitter account. Table 1.4 shows the breakdown of Twitter users by grade-level. High school teachers reported the highest number of Twitter users (90%), followed by middle school teachers (78.5%), and elementary school teachers (70.2%). Higher education professionals and educational consultants had a lower number of Twitter users in comparison, but these Twitter users represented a large percentage of the total respondents from these two groups.

**Table 1.4 Twitter users by grade-level**

<table>
<thead>
<tr>
<th>Grade-level (N=263)</th>
<th>Yes n (%)</th>
<th>No n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K to 5 (n=47)</td>
<td>33 (70.2)</td>
<td>14 (29.8)</td>
</tr>
<tr>
<td>6 to 8 (n=79)</td>
<td>62 (78.5)</td>
<td>17 (21.5)</td>
</tr>
</tbody>
</table>
The percentage of respondents using Twitter (80%) is considerably higher than findings from a 2013 Pew Research Center report which surveyed 2,452 teachers and found that the percent of teachers using Twitter (26%) was higher than national figures for all U.S. adults – 16% of adult Internet users and 14% of U.S. adults ages 18+ are using Twitter (Purcell, Heaps, Buchanan, & Friedrich, 2013). The high percentage of respondents using Twitter is most likely a result of participant recruitment through the #sschat listserv, which includes teachers who participate in weekly Twitter chats using the #sschat hashtag.

The majority of participants use Twitter for both personal and professional purposes (60%), compared with those that only use Twitter for personal (35%) or professional (6%) purposes. Figure 1 shows the breakdown of use by grade-level. On average, respondents reported regularly checking Twitter, tweeting an average of 50 times per month (median=10 times per month), and following an average of 270 Twitter accounts. Approximately 84% of respondents using Twitter reported following an average of sixteen educational organizations on Twitter.
Finally, respondents were asked about their professional use of Twitter. The top three professional uses of Twitter reported by respondents include: locating teaching resources (78.4%), connecting with education professionals outside of their own school (71.4%), and participating in discussions with other teachers or educational professionals (64.8%). Table 1.5 shows a breakdown of the professional uses of Twitter by grade-level. It is interesting to note that the elementary, middle, and high school teachers ranked the top two professional uses of Twitter as locating teaching resources and connecting with education professionals outside of school. Respondents from the higher education group also ranked locating teaching resources as its top professional use, followed by discussing broader education issues. The “Other” group, made up of educational consultants, ranked learning about professional development opportunities as its top professional use of Twitter, followed by locating teaching resources.
Table 1.5 Professional uses of Twitter by grade-level (percentages)

<table>
<thead>
<tr>
<th>Professional Use</th>
<th>K to 5 (n=33)</th>
<th>6 to 8 (n=62)</th>
<th>9 to 12 (n=103)</th>
<th>Higher Ed (n=9)</th>
<th>Other (n=6)</th>
<th>Total (n=213)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating teaching resources</td>
<td>66.7</td>
<td>87.1</td>
<td>79.6</td>
<td>66.7</td>
<td>50</td>
<td>78.4</td>
</tr>
<tr>
<td>Learning new teaching strategies</td>
<td>51.5</td>
<td>67.7</td>
<td>68.9</td>
<td>33.3</td>
<td>0</td>
<td>62.4</td>
</tr>
<tr>
<td>Giving/receiving advice on handling issues in the classroom</td>
<td>24.2</td>
<td>41.9</td>
<td>32</td>
<td>22.2</td>
<td>16.7</td>
<td>32.9</td>
</tr>
<tr>
<td>Participating in discussions with other teachers or education professionals</td>
<td>48.5</td>
<td>75.8</td>
<td>67</td>
<td>44.4</td>
<td>33.3</td>
<td>64.8</td>
</tr>
<tr>
<td>Connecting with education professionals outside of your school</td>
<td>66.7</td>
<td>82.3</td>
<td>70.9</td>
<td>44.4</td>
<td>33.3</td>
<td>71.4</td>
</tr>
<tr>
<td>Learning about professional development opportunities</td>
<td>33.3</td>
<td>59.7</td>
<td>46.6</td>
<td>33.3</td>
<td>66.7</td>
<td>48.4</td>
</tr>
<tr>
<td>Discussing broader education issues</td>
<td>36.4</td>
<td>62.9</td>
<td>55.3</td>
<td>55.6</td>
<td>50</td>
<td>54.5</td>
</tr>
</tbody>
</table>

Finding 2: Categories of content and their value to teachers

The survey and content analysis data gathered in this study provides insight into the categories of Twitter content that teachers value (RQ2) and the extent to which the three cultural institutions examined are providing content that aligns with teachers’ value ratings (RQ3). This section begins by examining teachers’ general value ratings of categories of Twitter content, then looks at how respondents ranked individual tweets representing each category of content on the same 5-point value scale. Next, the relationship between the value rating and the likelihood that the teachers will take action on a particular tweet is examined – for example, how likely are respondents to click
through to view the website linked from the URL, incorporate the information from the message into their teaching or professional development, or share the content with a colleague. Finally, the content analysis data is presented to determine the extent to which the Twitter content currently produced by institutions aligns with the type of content that teachers’ value.

**Finding 2.1 Value of categories of content**

The following section presents respondents’ value ratings for each category of Twitter content that emerged from the content analysis. In part one, respondents were asked to rate how valuable certain categories of Twitter content are to their work as teachers. In part two, we validated these initial category value ratings by asking respondents to rate individual tweets representing each category.

**Value ratings of categories before viewing example tweet**

Before viewing screenshots of tweets representing each category of content, all respondents were presented with a list of seven categories of Twitter content that emerged from the content analysis and were asked to rate how valuable the types of messages are to teachers (part I). The seven categories included: links to teaching resources, teaching strategies, education-related news, education policy, event announcements, discussions or requests for action, and self-promotion tweets. The replies category identified in the content analysis was not included in this question. Choices ranged from “extremely valuable” (1) to “not at all valuable” (5). It should be noted that the data was recoded before analysis so that “extremely valuable” choices received the highest rating (5) and the “not at all valuable” choices received the lowest rating (1).
In this first question, the top three categories of content rated the most valuable were links to teaching resources (mean=4.16), education-related news (mean=3.67), and teaching strategies (mean=3.65). Table 1.6 shows the mean value rating for each of the seven categories.

**Value ratings of categories after viewing example tweet**

After respondents rated the value of different categories of content, each participant was randomly presented with a screenshot of one of the four tweets from each category (part II). In addition to the screenshot of the tweet, participants were presented with any URLs included in the tweet and had the option to click and follow the URL.13

Respondents were first asked to imagine that the tweet popped up in their Twitter feed and rate how valuable they think the message is to their teaching on a 5-point scale. Choices ranged from “extremely valuable” (1) to “not at all valuable” (5). Respondents were then asked to rate how likely they would be to take three different actions if a similar tweet popped up in their Twitter feed. The actions included: clicking through to view the website linked from the URL, incorporating the information from the message into their teaching or professional development, and sharing the content with a colleague. Choices on the 5-point scale ranged from “very likely” (1) to “very unlikely” (5). Data was recoded before analysis.

When teachers were presented with an example tweet for each category, the top three categories of content rated the most valuable were teaching strategies (mean=3.7), self-promotional (mean=3.09), and teaching resources tweets (mean=3.07). Table 1.6 shows the mean value rating for each of the seven categories when represented by actual
tweets. The education policy category identified in the content analysis was not included in this question.14

Table 1.6 Category value: General & value when represented by tweets

<table>
<thead>
<tr>
<th>Category of Content</th>
<th>General Category Value (Mean)</th>
<th>Category Value when Represented by Tweets (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links teaching resources (e.g. tools, primary sources, activities)</td>
<td>4.16</td>
<td>3.07</td>
</tr>
<tr>
<td>Teaching strategies (e.g. Adapting lessons for English Language Learners)</td>
<td>3.65</td>
<td>3.70</td>
</tr>
<tr>
<td>Education-related news (e.g. links to background information, stories, news)</td>
<td>3.67</td>
<td>2.93</td>
</tr>
<tr>
<td>Event announcements</td>
<td>3.26</td>
<td>2.59</td>
</tr>
<tr>
<td>Discussions/Requests (e.g. requests for response, advice, or action)</td>
<td>3.56</td>
<td>2.62</td>
</tr>
<tr>
<td>Self-promotion (e.g. Facts, trivia, status updates)</td>
<td>2.31</td>
<td>3.09</td>
</tr>
<tr>
<td>Education policy (local, national, global educational policies and laws, educational reform)</td>
<td>3.33</td>
<td>n/a</td>
</tr>
<tr>
<td>Reply</td>
<td>n/a</td>
<td>2.79</td>
</tr>
</tbody>
</table>

Note: Data recoded for analysis; “extremely valuable” (5), “not at all valuable” (1)

Categories of content: Comparison

The means of the general category value ratings (Table 1.6, Column 2) and the means of the category value ratings when represented by example tweets (Table 1.6, Column 3) are compared in Figure 2. The general value rating shows how respondents rated the value of each category before seeing any example tweets. The specific value rating shows how respondents rated the value of exemplar tweets representing each category of content. It is interesting to note the difference between the two value ratings for each category. In some cases (e.g. teaching resources), respondents rated the category
higher before seeing the example tweets. This difference might represent a disconnect between what respondents expect of a particular content category and the actual content being published by the institutions. In two categories, teaching strategies and self-promotion tweets, the value ratings increased after respondents viewed examples of the tweets, showing that the example tweets exceeded respondents’ expectations of value.

**Figure 2. Comparison of mean value rating for categories of content**

![Comparison of mean value rating for categories of content](image)

Note: Categories that proved statistically significant are starred, ****p < .001.

Next, we wanted to see if there were differences between respondents’ perceived value ratings and their actual value ratings. To do this, we compared the means for each category using a crosstab with chi-square test. There was a significant difference between the mean value ratings at the p<.05 level for the teaching resources, teaching strategies,
education-related news, requests, and self-promotion categories. The difference in event announcement means did not prove statistically significant. Education policy and reply tweets were not tested for significance because these categories were not tested for both perceived and actual value.

**Finding 2.2 Likelihood of taking action**

Next we wanted to explore the likelihood that participants would take specific actions including: clicking through to view the website linked from the URL (only asked for tweets with a URL), incorporating the information from the message into their teaching or professional development, and sharing content with a colleague. The data in Table 1.7 shows that respondents are more likely to take action on tweets to which they assigned a higher value rating.

**Table 1.7 Comparison of mean value ratings for categories and likelihood of taking action**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value (Mean)</th>
<th>Clicking (Mean)</th>
<th>Incorporating (Mean)</th>
<th>Sharing (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching resources</td>
<td>3.07</td>
<td>4.10</td>
<td>3.50</td>
<td>3.51</td>
</tr>
<tr>
<td>Teaching strategies</td>
<td>3.70</td>
<td>4.12</td>
<td>3.71</td>
<td>3.64</td>
</tr>
<tr>
<td>Education-related news</td>
<td>2.93</td>
<td>3.52</td>
<td>3.09</td>
<td>3.04</td>
</tr>
<tr>
<td>Event announcements</td>
<td>2.59</td>
<td>3.05</td>
<td>2.64</td>
<td>2.66</td>
</tr>
<tr>
<td>Requests/Discussions</td>
<td>2.62</td>
<td>3.20</td>
<td>2.77</td>
<td>2.86</td>
</tr>
<tr>
<td>Reply</td>
<td>2.79</td>
<td>3.49</td>
<td>3.04</td>
<td>2.87</td>
</tr>
<tr>
<td>Self-promotion</td>
<td>3.09</td>
<td>3.56</td>
<td>3.16</td>
<td>3.20</td>
</tr>
</tbody>
</table>

Note: Data recoded for analysis; “extremely valuable” & “very likely” (5), “not at all valuable” & “very unlikely” (1)

Linear regressions were run to determine the significance and demonstrate the relationship between a category’s overall value rating (Table 1.7, Column 1) and the likelihood of taking certain actions. There was a significant difference between the mean
value ratings and likelihood of taking action levels for all categories. There was also a positive relationship demonstrated between the value and likelihood of action for all categories. Table 1.8 presents this data.

**Table 1.8 Relationship between category value and action**

<table>
<thead>
<tr>
<th>Category</th>
<th>Click</th>
<th>Incorporate</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching resources</td>
<td>B=.557****</td>
<td>B=.478****</td>
<td>B=.492****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.368</td>
<td>R-squared=.286</td>
<td>R-squared=.234</td>
</tr>
<tr>
<td>Teaching strategies</td>
<td>B=.832****</td>
<td>B=.825****</td>
<td>B=.815****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.689</td>
<td>R-squared=.656</td>
<td>R-squared=.508</td>
</tr>
<tr>
<td>Education-related news</td>
<td>B=.856****</td>
<td>B=.872****</td>
<td>B=.765****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.541</td>
<td>R-squared=.613</td>
<td>R-squared=.425</td>
</tr>
<tr>
<td>Event announcements</td>
<td>B=.991****</td>
<td>B=.867****</td>
<td>B=.857****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.742</td>
<td>R-squared=.711</td>
<td>R-squared=.647</td>
</tr>
<tr>
<td>Requests/Discussions</td>
<td>B=.984****</td>
<td>B=.828****</td>
<td>B=.728****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.618</td>
<td>R-squared=.577</td>
<td>R-squared=.419</td>
</tr>
<tr>
<td>Reply</td>
<td>B=.948****</td>
<td>B=.909****</td>
<td>B=.886****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.763</td>
<td>R-squared=.767</td>
<td>R-squared=.703</td>
</tr>
<tr>
<td>Self-promotion</td>
<td>B=.920****</td>
<td>B=.847****</td>
<td>B=.893****</td>
</tr>
<tr>
<td></td>
<td>R-squared=.719</td>
<td>R-squared=.708</td>
<td>R-squared=.662</td>
</tr>
</tbody>
</table>

Note: Categories that proved statistically significant are starred, ****p < .001.

**Finding 2.3 Categories represented in institutions’ Twitter feeds**

After determining the categories of content that are most valuable to teachers, it is interesting to examine the tweets from three cultural institutions’ to see the types of content being published and whether this content aligns with the categories that teachers think are most valuable. A total of three hundred tweets (one hundred tweets per institution) were randomly selected and analyzed by two coders. The coders were allowed to apply a maximum of two category labels to each tweet.

The top four categories of content currently published by the three institutions are teaching resources tweets (48.7%), education-related news tweets (22.7%), self-promotion tweets (19.3%), and event announcement tweets (17.3%). Table 1.9 presents
the breakdown of categories by institution and compares these percentages to the overall mean value ratings of these categories. One of the most noticeable observations is that the category rated most valuable, teaching resources, is one of the least represented type of tweet in the Twitter feeds of the institutions.

**Table 1.9 Comparison of categories present in institutions’ Twitter content**

<table>
<thead>
<tr>
<th>Category</th>
<th>NARA (n=100)</th>
<th>Smithsonian (n=100)</th>
<th>NEH (n=100)</th>
<th>Total (n=300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching resources</td>
<td>3.07</td>
<td>68</td>
<td>15</td>
<td>63</td>
</tr>
<tr>
<td>Teaching strategies</td>
<td>3.70</td>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Education-related news</td>
<td>2.93</td>
<td>15</td>
<td>37</td>
<td>16</td>
</tr>
<tr>
<td>Event announcements</td>
<td>2.59</td>
<td>12</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Requests/Discussions</td>
<td>2.62</td>
<td>4</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Reply</td>
<td>2.79</td>
<td>12</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>Self-promotion</td>
<td>3.09</td>
<td>18</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>Education Policy</td>
<td>n/a</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Category value data recoded for analysis; “extremely valuable” (5), “not at all valuable” (1)

**Finding 3: Structural characteristics and their impact on value**

The third finding examines how five structural components of tweets affect teachers’ value ratings of the message (RQ4) and the extent to which the three cultural institutions examined are incorporating these structural components into their tweets (RQ5). In the survey, respondents were presented with two tweets representing good and bad examples of five structural components and asked to rate them on the same 5-point value scale discussed earlier. The researcher made the determination of good and bad examples after examining literature on Twitter best practices and after survey pre-tests revealed certain tweets that were more confusing than others. For each structural
component, the “good” example was overwhelmingly rated as more valuable to teachers. A paired samples t-test was conducted between each pair of tweets. There was a significant difference between the mean value ratings of each structural component at the p<.05 level for all pairs. These findings are presented in Table 1.10.

**Table 1.10 Structural component value ratings**

<table>
<thead>
<tr>
<th>Component value</th>
<th>Component value (Mean)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context (Good)</td>
<td>2.74</td>
<td>p = .000</td>
</tr>
<tr>
<td>Context (Bad)</td>
<td>2.05</td>
<td>p = .000</td>
</tr>
<tr>
<td>Hashtags (Good)</td>
<td>2.84</td>
<td>p = .000</td>
</tr>
<tr>
<td>Hashtags (Bad)</td>
<td>1.86</td>
<td>p = .000</td>
</tr>
<tr>
<td>Asking questions (Good)</td>
<td>3.74</td>
<td>p = .000</td>
</tr>
<tr>
<td>Asking questions (Bad)</td>
<td>2.50</td>
<td>p = .003</td>
</tr>
<tr>
<td>URLs (Good)</td>
<td>3.51</td>
<td>p = .000</td>
</tr>
<tr>
<td>URLs (Bad)</td>
<td>2.67</td>
<td>p = .000</td>
</tr>
<tr>
<td>Reply (Good)</td>
<td>2.98</td>
<td>p = .000</td>
</tr>
<tr>
<td>Reply (Bad)</td>
<td>1.36</td>
<td>p = .000</td>
</tr>
</tbody>
</table>

Note: The component value data represents the mean value rating for each of the structural components. The component value data was recoded for analysis; “extremely valuable” (5), “not at all valuable” (1)

The structural components, context, hashtags, questions, URLs, and replies, were also examined in the content analysis. During the content analysis, two coders examined three hundred randomly selected tweets (100 per institution) for each of the five structural components evaluated in the survey. A summary of findings is presented in Table 1.11 with a detailed description of each component below.
Table 1.11 Structural components present in institutions’ Twitter content

<table>
<thead>
<tr>
<th>Structural component</th>
<th>NARA (n=100)</th>
<th>Smithsonian (n=100)</th>
<th>NEH (n=100)</th>
<th>Total n=300 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context (Yes)</td>
<td>73</td>
<td>81</td>
<td>62</td>
<td>216 (72.0)</td>
</tr>
<tr>
<td>Hashtags (Average)</td>
<td>1.14</td>
<td>0.45</td>
<td>2.96</td>
<td>n/a</td>
</tr>
<tr>
<td>Asks question (Yes)</td>
<td>9</td>
<td>25</td>
<td>17</td>
<td>51 (17.0)</td>
</tr>
<tr>
<td>URL (Yes)</td>
<td>93</td>
<td>93</td>
<td>74</td>
<td>260 (86.7)</td>
</tr>
<tr>
<td>Contextual reply (Yes)</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>12 (4.0)</td>
</tr>
</tbody>
</table>

**Structural component: Context**

Seventy-two percent of the sample tweets were coded as having context, or enough descriptive background information for the reader to determine what the tweet was about, what the URL was linking to, or, in some cases, the time period in which the primary source could be placed. The majority of tweets coming from each of the three institutions were coded as having context. Tweets that demonstrate a low-level of context are characterized by few descriptive words that make it hard to determine what the tweet is about or where the URL will lead.

**Structural component: Hashtags**

The second component looked at the number of hashtags included in a tweet. While the literature does not recommend an ideal number of hashtags, the data in Table 1.10 shows a significant difference in the value rating of the good hashtag example, with one hashtag, and the bad example, with six hashtags. Using one to three hashtags ensures that a tweet readable, especially for new Twitter users. Using fewer hashtags also ensures there are enough characters for the retweeting a message. The content analysis revealed that tweets from the NEH Twitter feed include a higher average of hashtags (m=2.86) compared to the NARA feed (m=1.14), and the Smithsonian Education feed (m=0.45).
**Structural component: Questions**

The third component examined the use of questions to engage followers. In the survey, there was a significant difference between the value rating for the good example, which included a question, and the bad example that did not. The content analysis revealed a low incorporation of this component, with only 17% of tweets including a question. Smithsonian Education had the most tweets that asked followers a question (n=25), followed by NEH (n=17) and NARA (n=9).

**Structural component: URLs**

Approximately 87% of tweets from the three institutions included a URL. URLs enable Twitter users to provide additional information while adhering to the short, 140-character limit. Considering that two of the highest valued categories were teaching strategies and teaching resources, including a URL is important for sharing these resources with teachers. The study also found that the higher the category value of a tweet, the more likely the teachers are to click through on a link to visit a website. Including a URL in a tweet will drive traffic to an institution’s website.

**Structural component: Contextual replies**

The final component examined how the institutions replied to users. In the survey, the tweet that represents a good reply is a modified tweet. In addition to the institution’s response to the follower, the tweet includes the text from the original tweet (Figure 3a). By including the text of the original tweet, the institution is sharing an endorsement with its followers, as well as the link to their website.
The other tweet presents a reply to a follower, “Thanks!” without any of the original context that might be useful for other followers (Figure 3b). In the content analysis, the coders identified 27% of reply tweets that were modified to include the original tweet context. All of the NARA reply tweets used this form of contextual reply; however, neither the Smithsonian nor NEH replies included text from the original tweet.

Discussion

This study examined the Twitter outreach practices of three U.S. cultural institutions. In particular, the study used a survey and content analysis of tweets from the three institutions to determine the categories of content and structural components most valuable to teachers. The following discussion highlights the results of the study and offers recommendations for institutions using Twitter for outreach to teachers.

The first set of research questions focused on identifying the categories of Twitter content that teachers value (RQ2) and the extent to which the three cultural institutions examined are providing content that aligns with teachers’ value ratings (RQ3). First, respondents were presented with a list of seven categories of Twitter content that emerged from the content analysis and asked to rate how valuable the types of messages
are to teachers. Rated on a 5-point scale, the top three categories of content rated the most valuable were links to teaching resources (mean=4.16), education-related news (mean=3.67), and teaching strategies (mean=3.65). Next, respondents were presented with exemplar tweets representing each of these categories and asked to rate them on the same value scale. The top three categories of content rated the most valuable were teaching strategies (mean=3.7), self-promotional (mean=3.09), and teaching resources tweets (mean=3.07).

These findings align with Twitter users’ responses presented in Table 1.5 – 78.4% of Twitter users reported using the micro-blogging tool for locating teaching resources. This finding is also reflected in the literature that discusses teachers’ use of Twitter for professional learning networks in which they engage in discussions with fellow teachers and exchange teaching resources and strategies (Cooke, 2012).

Another question that aimed to build deeper understanding of the categories of Twitter content that teachers value asked respondents to rate the likelihood that they would take specific actions. The in data shows that respondents are more likely to take action on tweets to which they assigned a higher value rating. Linear regression analysis revealed a positive relationship between the value rating for the category and the likelihood that a teacher will click on a URL, incorporate the tweet into their teaching, or share the tweet with a colleague. This last point is reflected in Forte, Humphreys, & Park’s (2012) study which found that teachers on Twitter share the ideas and strategies gathered from Twitter with teachers in their local community, serving as bridges.

Finally, the study examined how five structural components of tweets affect teachers’ value ratings of the message (RQ4) and the extent to which the three cultural
institutions examined are incorporating these structural components into their tweets (RQ5). Respondents were presented with two tweets representing good and bad examples of five structural components – context, hashtags, questions, URLs, and replies. For each structural component, the “good” example was overwhelmingly rated as more valuable to teachers.

The five structural components were selected from lists of Twitter best practices. Although the literature recommends keeping tweets short to encourage retweeting, context is important for teachers that have limited time to read and evaluate whether the tweet meets their particular content needs. Hashtags are valuable for reaching certain Twitter communities or organizing Twitter discussions, like those that use the #sschat or #edchat hashtags. Although hashtags are valuable, too many hashtags take up valuable characters that can be used to provide additional context.

The third component, asking questions to followers, facilitates dialogic communication and shows the institution’s interest in engaging in discussion with followers. Survey data and the literature highlight teachers’ use of Twitter for sharing and discussing ideas with teachers outside of their local school building (Cooke, 2012). Teachers who feel their ideas are valued are more likely to engage with the institution (Stuart, 2010). As discussed earlier URLs are an important component for providing additional content. Finally, respondents rated reply tweets that include the text of the original tweet as more valuable. Best practice literature recommends limiting the use of public thank you replies; however, replying in a modified format seems effective because it combines the thank you with the original context, which is useful for all followers.
Recommendation 1. Add context to teaching resources tweets

One of teachers’ top uses of Twitter is for locating teaching resources. Data also shows that teaching resources tweets that include links to lessons and activities are rated as one of the most valuable categories of message to teachers. The content analysis revealed a range of teaching resources tweets. Many were identified as having context; however, there were also tweets that were difficult to decipher due to their lack of context. The Pew report found that, “teachers use the internet on a weekly basis to find material for creating lesson plans, keep up with research and developments in their field, and find material that will engage their students (Purcell, Heaps, Buchanan, & Friedrich, 2013).” Including adequate context in teaching resources tweets will help teachers to quickly evaluate resources and their relevance to content standards.

Recommendation 2. Tweet about teaching strategies

Although respondents consistently ranked teaching strategies tweets as one of the most valuable categories of messages to teachers, the content analysis revealed a low number of tweets that include teaching strategies content. This can most likely be explained by the nature of the three institutions being examined. The National Archives and Smithsonian are mostly using Twitter to promote their collections (teaching resources) and programs (events). Similarly, the National Endowment for Humanities tweets valuable teaching resources created by their staff and promotes resources from other institutions. One way to generate more teaching strategies content is to ask more questions and facilitate discussions around the institutions’ content. By asking questions, the institutions’ invite teachers to collaborate via Twitter and share their ideas and
strategies for using teaching resources in the classroom. These ideas and strategies can be captured by the institution and used to generate more teaching strategies content.

**Recommendation 3. Add context to replies, or reply privately**

When teachers rated the value of good and bad reply tweets, the tweet that replied to the follower and included the original context of the tweet was rated as more valuable than the tweet that simply said, “Thanks for the RT!” The content analysis revealed different methods institutions are using for replying to their followers. NARA consistently replied to followers by adding a word of thanks to the original message. Not only does this method provide the context for other followers, but it also allows the institution to share endorsements and recommendations from followers. If a reply does not include the original context, it is best to reply privately via direct message.

**Conclusion**

The use of Twitter for organizational outreach is a growing practice. This study helps fill a gap in the literature by providing insight into Twitter outreach to K-12 teachers, particularly by cultural institutions. This study will benefit both institutions and teachers by providing data and recommendations that can be used to inform Twitter outreach to teachers.

**Limitations**

One limitation of this research is the small number of institutions being examined. The research should be expanded beyond federal cultural institutions to analyze other institutions’ Twitter outreach to teachers. Involving more coders and analyzing a larger sample of tweets will also enhance reliability and provide more nuanced data. A second limitation is the sole examination of Twitter. Building upon this research to examine
outreach via other forms of social media (e.g. Facebook) would provide deeper understanding of teacher preferences. In addition to studying other forms of social media, surveying a larger group of teachers that includes more non-Twitter users will provide additional data and offer more facets for trend analysis.

Future studies that address these limitations will provide a deeper understanding of teachers’ Twitter use for locating teaching and professional development resources. These insights will inform institutions’ Twitter outreach to teachers and ensure that the content being promoted is effectively meeting teachers’ needs.
Notes

1 Definitions from Java et al. (2007) – “Daily chatter: messages that discuss daily routines or what people are currently doing; Conversations: directing a message to a particular user by including the @ symbol followed by the users name; Sharing information/URLs: messages that contained URLs; Reporting news: messages that report the latest news or comment about current events.”

2 “Me now” statements are similar to “daily chatter” messages defined by Java et al. “Me now” statements show that its “all about the user” much of the time (Naaman, Boase, & Lai, 2010)

3 Definitions from Java et al. (2007) – “Information sources: users that with a large number of followers, serves as a hub, posting updates at regular intervals or infrequently; Friends: users with many sub-categories of friendships on Twitter; Information seekers: users who follow others regularly, but post infrequently.”

4 Baumgarten (2011) examined four dialogic communication principles – “Dialogic loop: users are invited to respond, interact, or join a group discussion; Usefulness of information: whether content is relevant to the organization, its goals, and the audience; Generation of return visits: message contains explicit invitations for users to return to the webpage at a later date; Conservation of visitors: attempts to keep visitors on websites as long as possible.”

5 Definition from Waters et al. (2011) – “Public information model: a one-way communication approach that focuses on the dissemination of truthful messages.”

6 Definition from Waters et al. (2011) – “Two-way asymmetry: dialogue created with users in order to obtain information for organizational benefit; Two-way symmetry: legitimate conversations between organization and stakeholder with goal of mutual understanding.”

7 Content categories included: question to followers, information sharing, self-promotion, random thought, opinion/complaint, me now, conversation, and presence maintenance (André, Bernstein, & Luther, 2012).

8 Dataset included 43,738 tweet ratings of which a sample of 4,220 ratings was selected (Ibid.).

9 See Appendix A for detailed instructions on using the Twitter API to capture tweets.

10 See Appendix B for the complete coding protocol

11 K-12 teachers have started several weekly Twitter chats that focus on a range of education or subject-specific topics. Each week, teachers vote on a topic, then “meet” on Twitter to discuss the topic for an hour. Teachers who are participating in the chat mark
each tweet with the hash tag #sschat, this keeps the tweets together. Someone from the community serves as a moderator and helps to guide the conversation by tweeting questions. As a more permanent space to share ideas, the teachers who participate in #sschat created a Ning.

12 See the full list of professional uses in Q7 of the complete survey provided in Appendix C.

13 See the complete survey in Appendix C for the text of these questions (Q11, Q12).

14 See Appendix E for the results of a repeated measures ANOVA that was conducted to determine the significance between the mean value ratings of each category when represented by example tweets.
References


Appendix A – Downloading Tweets Using the Twitter API

The Twitter API allows the download of 200 tweets at a time. A work around (detailed below) was used to enable the researcher to download all of the tweets visible on the Smithsonian, NARA, and NEH Twitter timelines.

1. Run the Twitter API by plugging the following code into the search engine search bar. When searching each institution, insert the Twitter screen name into the code. Make sure the count is set to 200. This will ensure that the most recent 200 tweets from each institution will be returned.

For example:

Smithsonian Education (@SmithsonianEdu):
https://api.twitter.com/1/statuses/user_timeline.xml?include_entities=true&include_rts=true&screen_name=smithsonianedu&count=200

National Arcives (@DocsTeach)
https://api.twitter.com/1/statuses/user_timeline.xml?include_entities=true&include_rts=true&screen_name=docsteach&count=200

National Endowment for the Humanities (@EDSITEment)
https://api.twitter.com/1/statuses/user_timeline.xml?include_entities=true&include_rts=true&screen_name=edsitement&count=200

2. Then, looking through the returned XML code, locate the last tweet returned. Copy the tweet ID of the last tweet. Note: there is a tweet ID (status_id) and user_id. Make sure to copy the status_id, which is different for each tweet.

Example of XML code:
<created_at>Wed Oct 31 14:08:13 +0000 2012</created_at>
:id>26364354115371521</id>
</text>@pearsonsstudies We are glad to share our resources! Thank you for the RT and support!</text>

3. Add &max_id to the code above. Run the updated Twitter API, adding the status_id for the last tweet returned after the &max_id=(insert status_id here). Starting with the last tweet returned, the search will retrieve the next 200 tweets.

https://api.twitter.com/1/statuses/user_timeline.xml?include_entities=true&include_rts=true&screen_name=docsteach&count=200&max_id=(insert status_id here)

4. Repeat steps 2 & 3, replacing the &max_id each time with the status_id for the last returned tweet. This will enable the download of the tweets on a user’s Twitter timeline.

5. Right click and save each page of XML code. Import all XML code files into Excel.
## Appendix B - Coding Protocol

<table>
<thead>
<tr>
<th>Variable</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1. Institution</td>
<td>1= NARA (@DocsTeach) 2= Smithsonian (@SmithsonianEdu) 3= NEH (@Edsitement)</td>
<td>This first variable notes which institution each tweet is from.</td>
</tr>
<tr>
<td>V2. Category of tweet</td>
<td>1= Teaching resources</td>
<td>Teaching resources tweets link to or describe tools, primary sources, activities, or lesson plans that can be used in the classroom.</td>
</tr>
<tr>
<td></td>
<td>2= Teaching strategies</td>
<td>Teaching strategies tweets are different from teaching resources tweets because they provide “How to…” information for teachers. For example, the tweet might provide ideas/methods/strategies for adapting lessons for English Language Learners.</td>
</tr>
<tr>
<td></td>
<td>3= Education related news</td>
<td>Education related news tweets include links to background information that teachers might use when developing lesson plans, education-related stories or news.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4= Education policy</td>
<td>Education policy tweets discuss local, national, global educational policies and laws or educational reforms.</td>
<td></td>
</tr>
<tr>
<td>5= Event announcements</td>
<td>Event announcements provide information about upcoming events. This category does not include tweets that provide “On this day” or “This day in history” information.</td>
<td></td>
</tr>
<tr>
<td>6= Requests</td>
<td>This category is characterized by requests for response, advice, or action. These tweets usually involve the institution asking a question for Twitter followers to answer, or asking for Twitter followers to take a particular action (e.g. Vote for…).</td>
<td></td>
</tr>
<tr>
<td>7= Replies</td>
<td>Reply tweets are generally characterized by the “@” symbol which is being used to reply to another person/organization’s tweet.</td>
<td></td>
</tr>
<tr>
<td>8= Self-promotion</td>
<td>Self-promotion tweets are usually not targeted at a particular audience (in this case teachers), but instead provide general information about the organization. These tweets might include facts or trivia about the institution, as well as status updates.</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>V3. Second Category of tweet</td>
<td>(Use same codes as above) This variable provides the opportunity to apply a second category to a tweet. The codes are the same as above. If there is not a second category for the tweet, simply put “0” in this column.</td>
<td></td>
</tr>
</tbody>
</table>
| V4. Context | 0= No context  
1 = Yes, there is context The tweet exhibits context if it provides enough background or descriptive information for the reader to determine what the tweet is about, what the URL is linking to, or in some cases, what time period the primary source can be placed in. |
| V5. Number of hash tags | (Include a number here) List the number of hash tags counted in the tweet. |
| V6. Asks a question | 0= No  
1 = Yes Does the tweet ask a question to the reader? In some cases, the tweets include the title of a primary source or an article that has a question in the title; however, the question is not being posed to the reader. In these cases, this variable would be marked with a “0” because the reader is not being asked a question. |
| V7. Includes URL | 0= No  
1 = Yes Does the tweet include a URL? |
| V8. Promotes another institution | 0= No  
1 = Yes In some tweets, institutions promote the resources, events, or tweets of another institution. The information being promoted is not related to the work of NARA, Smithsonian, or NEH. This does not include tweets that are promoting another department, office, or museum within the same institution. |
| V9. RT | 0= No  
1 = Yes  
2= RT or MT with additional information added by institution Code “2” should be used for tweets where the institution RT (retweets) and adds additional information to the original tweet (sometimes marked as a MT, modified tweet). |
| V10. Language | 0= English  
1 = Spanish  
2= French |
Appendix C – Survey Questions

Q2 Do you have a Twitter account?

☐ Yes (1)
☐ No (2)

**Note: If “No” is selected, participants will skip Q3- Q9**

Q3 In the last month, how many times did you tweet?

________

Q4 In the last month, how often did you check Twitter?

☐ Very Often (1)
☐ Regularly (2)
☐ Sometimes (3)
☐ Once or Twice (4)
☐ Never (5)

Q5 How many people do you follow on Twitter?

________

Q6 Do you use Twitter for professional or personal purposes?

☐ Professional (1)
☐ Personal (2)
☐ Both Professional and Personal (3)

Q7 For what professional purposes do you use Twitter? (Check all that apply)

☐ Locating teaching resources (1)
☐ Learning new teaching strategies (2)
☐ Giving/receiving advice on handling issues in the classroom (3)
☐ Participating in discussions with other teachers or education professionals (4)
☐ Connecting with education professionals outside of your school (5)
☐ Learning about professional development opportunities (6)
☐ Discussing broader educational issues (7)
☐ Other (Please specify) (8) ____________________
Q8 Do you follow any educational organizations on Twitter?
☑ Yes (1)
☑ No (2)

Q9 How many educational organizations do you follow on Twitter?
_______
Q10 Now I am going to ask you to assign value to certain types of messages you might see on Twitter.

Generally speaking, how valuable do you think the following types of Twitter messages are to teachers?*

<table>
<thead>
<tr>
<th>Message Type</th>
<th>Extremely Valuable (1)</th>
<th>Very Valuable (2)</th>
<th>Moderately Valuable (3)</th>
<th>Slightly Valuable (5)</th>
<th>Not at all Valuable (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links teaching resources (e.g. tools, primary sources, activities) (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching strategies (e.g. Adapting lessons for English Language Learners) (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education-related news (e.g. links to background information, stories, news) (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education policy (local, national, global educational policies and laws; educational reform) (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event announcements (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussions (e.g. requests for response, advice, or action) (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-promotion (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: These responses were recoded during analysis so that “extremely valuable” was equal to 5 and “not at all valuable” was equal to 1.

**Note: The following questions are repeated for each selected Twitter message (Q11-Q66). Instead of repeating the questions in this version of the survey, the questions are included once, and each tweet that will be inserted is listed in Appendix D at the end of the survey.**

In the next section, you will be presented with several Twitter messages. Please read and answer the questions for each Twitter message. Think about the type of content of each tweet and whether the message is useful in your role as a teacher. You do not have to be a Twitter user to answer the questions.

Some tweets may cover topics or subjects you usually do not teach in your classroom setting. The purpose is not to analyze the value of the topic (e.g. Civil War), but rather the type of information presented.
Read the tweet and answer the questions below. You may click on the URL link to view the page referenced in the tweet.

**URL:** [http://t.co/U8icT9tk](http://t.co/U8icT9tk)

Q11 Imagine this tweet popped up in your Twitter feed. Overall, how valuable do you think this message is to your teaching?*

- Extremely Valuable (1)
- Very Valuable (2)
- Moderately Valuable (3)
- Slightly Valuable (4)
- Not at all valuable (5)

Q12 If a similar tweet that provides links to teaching resources pops up in your Twitter feed, how likely are you to...

*Note: These responses were recoded during analysis so that “extremely valuable” was equal to 5 and “not at all valuable” was equal to 1.
**Note: The same format will be used for Q67-Q76. Each tweet that will be inserted is listed in Appendix D at the end of the survey.**

In this next section, you will be asked to rate the value of several tweets based on how the information is presented or structured in the tweet.

Tweet structure

Read the tweet and answer the questions based on how the information is presented or structured in the tweet. You may click on the URL link to view the page referenced in the tweet.

Q67 Imagine this tweet popped up in your Twitter feed. Overall, how valuable do you think this message is to your teaching?*

- Extremely Valuable (1)
- Very Valuable (2)
- Moderately Valuable (3)
- Slightly Valuable (4)
- Not at all valuable (5)

*Note: These responses were recoded during analysis so that “extremely valuable” was equal to 5 and “not at all valuable” was equal to 1.
Q77 Which of the following comes closest to your primary job responsibility?

- Classroom teaching (1)
- Administrative (e.g., Principal) (2)
- Librarian or Media Specialist (3)
- Content specialist (4)
- Department Head (5)
- Other (Please specify) (6) ____________________

Q78 Which of the following statements best describes you?

- I teach students in a classroom setting (1)
- I teach students, but not in a classroom setting (e.g., tutoring or home school) (2)
- I do not teach students (3)

Q79 For how many years have you been teaching? 
__________

Q80 What level of students do you work with? (Check all that apply)

- Kindergarten through second grade (1)
- Third through fifth grade (2)
- Sixth through eighth grade (3)
- Ninth through twelfth grade (4)
- Undergraduate students (5)
- Graduate students (6)
- Other (Please specify) (7) ____________________

Q81 In what type of environment do you work?

- Public school or school system (1)
- Private or independent school or school system (2)
- Religious or parochial school or school system (3)
- Home school (4)
- College or university (5)
- Other (Please specify) (6) ____________________

Q82 In what type of area do you work?

- Urban (1)
- Suburban (2)
- Rural (3)
Appendix D – Tweet Screenshots

**Note: Ten types of message content were identified as part of the content analysis. Four example tweets from each category have been selected. Each participant will view one tweet from each of the ten categories, for a total of ten tweets.**

I. Categories

Teaching resources:

---

**DocsTeach @DocsTeach**

Irony in Arkansas: #OnThisDay in 1850 Congress passed the Fugitive Slave Act enforcing the return of escaped slaves http://ow.ly/6wn2N

---

**History Explorer @explorehistory**

Planning a Day of the Dead lesson with your class? Build your own altar with this interactive: ow.ly/710qM

---

**EDSITEment @EDSITEment**

How are American Indians represented in today’s society? Native American Cultures Across the US ow.ly/eedwp #engchat #engteacher...

---

**EDSITEment @EDSITEment**

More EDSITEment resources for US History Global Perspectives bit.ly/R5veCY #sschat #APUSHchat #APUSH #historyteacher #commoncore

---
Teaching strategies:

SmithsonianEducation @SmithsonianEdu 9 Nov 11
Excellent tool for using museum & library content with students:
@librarycongress Primary Source Analysis Tool: ow.ly/7nOvD
Expand

SmithsonianEducation @SmithsonianEdu 24 Feb
RT @amhistorymuseum: New on our blog: Teaching with drama ow.ly
/1hBlex
Expand

EDSITEment @EDSITEment 7 Oct
Build knowledge through content-rich non-fiction 1.usa.gov/oNn2nF
#sschat #historyteacher #engteacher #engchat #commoncore
#ccchat
Expand

DocsTeach @DocsTeach 9 Nov 11
Get your students ready for #NationalHistoryDay with the National
Archives' #DocsTeach docstech.org/home/national-... #NHD
Expand

Education-related news:

SmithsonianEducation @SmithsonianEdu 27 Mar
MT @LizMusEd: Another reason why museums should use Pinterest
--> Teachers Pin w/ Their Students: on.mash.to/GXASBF #musetech
#edtech
View summary

SmithsonianEducation @SmithsonianEdu 18 Mar 11
RT @amhistorymuseum: From the archives: A teacher’s perspective
on the Greensboro Sit-in Youth Town Hall #civilrights http://ow.ly
/46BYk
Expand
Event announcements:

EDSITEment @EDSITEment
Hispanic Heritage Month starts today edsitement.neh.gov/calendar/2012---- #sschat #historyteacher #engchat #engteacher #commoncore

SmithsonianEducation @SmithsonianEdu
Where did that apple on your desk come from, and why do your students keep bring them? s.si.edu/dw8nf via @SmithsonianMag

EDSITEment @EDSITEment
Join filmmaker Ken Burns & #DustBowl survivor Cal Crabill ow.ly/eyoGF #sschat #ushistory

EDSITEment @EDSITEment
Live webcast of @NationalHistoryDay’s award ceremony today at 8:30 AM ET ow.ly/byuoq #sschat #historyteacher

DocsTeach @DocsTeach
RT @USNatArchives: Free screening of winners of 2012 Student AcademyAwards, free at 7 pm Weds at the #NationalArchives go.usa.gov/v7B
Requests:

SmithsonianEducation @SmithsonianEdu 14 May
Vote now: Choose a historical figure to be composed and displayed at @amhistorymuseum ow.ly/aTrKB
Expand

EDSITEment @EDSITEment 25 Oct
To our wonderful followers-What can the #humanities teach you? Anybody? ow.ly/eL9ce #edchat #sschat
Expand

SmithsonianEducation @SmithsonianEdu 15 Jul 11
MT @smithsonian: Fun Friday Trivia: Did u know the Smithsonian has a connection to the #HarryPotter movie? Anyone know what it is?
Expand

EDSITEment @EDSITEment 10 Oct
MT @teachernextdoor: I'm working on a new hook for my To Kill a Mockingbird unit. Anyone have celebrity quotes about the book?...
Expand

Replies:

DocsTeach @DocsTeach 9 Jan
Thank you @seonyjeon ! RT: awesome!!! docsteach is amazing! thanks so much!
Expand

DocsTeach @DocsTeach 9 Jan
Thank you @sammorra ! RT: Have you checked out the activity tools from @DocsTeach bit.ly/cTJR2l Impressive! #edchat #sschat
Expand
Self-promotion:

*DocsTeach* @DocsTeach
A big thanks @njcssnetwork ! RT: Love the @DocsTeach iPad app! itunes.apple.com/us/app/national...
View app

*DocsTeach* @DocsTeach
Thanks @kcollazo ! RT: This is an awesome primary source site! The pre-built activities are terrific or build your own with their build tool
Expand

*SmithsonianEducation* @SmithsonianEdu
Happy Birthday to... us! The @Smithsonian turns 166 today! ow.ly/cSxTA
Expand

*SmithsonianEducation* @SmithsonianEdu
Explore the 150th anniversary of the Civil War through the collections of the Smithsonian Institution. http://on.fb.me/ozsibZ
Expand

*DocsTeach* @DocsTeach
Interested in keeping track of all primary sources we're adding to #docstech? Use the new document RSS feed at ow.ly/6Xzm8
Expand

*SmithsonianEducation* @SmithsonianEdu
RT @mpedson: We're prototyping the @Smithsonian Commons: Fast, Findable, Shareable, and Free. http://tinyurl.com/cxfjab #si20
Expand
II. Structural components

Context: Good

[Image of tweet]

Context: Bad

[Image of tweet]

Hashtags: Good

[Image of tweet]

Hashtags: Bad

[Image of tweet]

Asking Questions: Good

[Image of tweet]
Asking Questions: Bad

URLS: Good
Dig up a virtual stegosaurus skeleton on the site “Dinosaurs” from @NMNH http://t.co/qSLUvioz

URLS: Bad
@LearningProf We keep hearing that students don't like research, too time consuming, and they don't know if they'll find right answer

 Replies: Good

Replies: Bad
Appendix E – Results of repeated measures ANOVA

A repeated measures ANOVA was conducted to determine the significance between the mean value ratings of each category when represented by example tweets. There was a significant difference between the mean value ratings of each category at the p<.05 level for the seven categories [F = 25.092, p = .000]. Because an overall significant difference was found, additional ANOVA contrast tests were conducted to compare each category mean to every other category mean. The results of these tests, presented in Table 1.12, reveal the categories between which there is a significant difference.

Table 1.12 Significance between category value ratings when represented by tweets

<table>
<thead>
<tr>
<th></th>
<th>Teaching resources</th>
<th>Teaching strategies</th>
<th>Ed. news</th>
<th>Events</th>
<th>Requests</th>
<th>Reply</th>
<th>Self-promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n.s.</td>
</tr>
<tr>
<td>Teaching strategies</td>
<td>F=43.693 (p =.000)</td>
<td></td>
<td>n.s.</td>
<td>F=21.608 (p =.000)</td>
<td>F=17.200 (p = .006)</td>
<td>F=5.728 (p =.018)</td>
<td></td>
</tr>
<tr>
<td>Ed. news</td>
<td>n.s.</td>
<td></td>
<td>F=83.701 (p =.000)</td>
<td>F=111.212 (p =.000)</td>
<td>F=112.965 (p =.000)</td>
<td>F=64.840 (p =.000)</td>
<td>F=30.919 (p =.000)</td>
</tr>
<tr>
<td>Events</td>
<td>F=21.608 (p =.000)</td>
<td>F=111.212 (p =.000)</td>
<td>F=10.274 (p =.002)</td>
<td>n.s.</td>
<td>n.s.</td>
<td>F=18.550 (p =.000)</td>
<td></td>
</tr>
<tr>
<td>Requests</td>
<td>F=17.200 (p =.000)</td>
<td>F=112.965 (p =.000)</td>
<td>F=9.355 (p =.003)</td>
<td>n.s.</td>
<td>n.s.</td>
<td>F=20.555 (p =.000)</td>
<td></td>
</tr>
<tr>
<td>Reply</td>
<td>F=5.728 (p =.018)</td>
<td>F=64.840 (p =.000)</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
<td>F=5.375 (p =.021)</td>
<td></td>
</tr>
<tr>
<td>Self-promotion</td>
<td>n.s.</td>
<td></td>
<td>F=30.919 (p =.000)</td>
<td>n.s.</td>
<td>F=18.550 (p =.000)</td>
<td>F=20.555 (p =.000)</td>
<td>F=5.375 (p =.021)</td>
</tr>
</tbody>
</table>

Note: n.s. = not statistically significant