

Museum Learning via Social Media: (How) Can Interactions on Twitter Enhance the Museum Learning Experience?

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Museums are rich sources of artifacts, people and potential dialogic interactions. Recent developments in web technologies pose big challenges to museums to integrate such technologies in their learning provision. The study presented here is concerned with the potential of how school visits to museums can be enhanced by the use of social media. The Museum of London (MoL) is selected as the site of the study and the participants were a Year 9 History class (13-14 years old) in a secondary school in Milton Keynes. It draws on Falk and Dierking's (2000) Contextual Model of Learning and considers evidence of meaning making from students' tweets and activity on-site. Observational data during the visit, the visit's Twitter stream and post-visit interview data with the participants is presented and analysed. It is argued that use of Twitter, a microblogging platform (<http://twitter.com>), enhances the social interaction around museum artifacts and thus, the process of shared construction of meaning making, which can enrich the museum experience.

Keywords: museums; learning; social media; Twitter; case study; Museum of London

Harnessing the power of original, real things, that's what learning in museums is all about ...

Osborne (2004)

Introduction

New technologies and online services have changed the web radically in the past few years. As a result, our society has witnessed a shift to the means that were traditionally employed for communication and learning. This development brings both opportunities and challenges, for rethinking learning and education in both formal and non-formal learning spaces, such as museums.

Many museums, especially in western cultures, have responded to the challenges brought by social media and have embraced them enthusiastically (e.g. Smithsonian Institution, Tate Gallery, Museum of Modern Art). The discussion in the sector concerns the promises, opportunities, possibilities and realities brought by social media: for interaction and collaboration; for engaging with an audience beyond the physical location; for increasing geographic reach and their potential impact; for learning. Yet, despite this promise, social media sites such as Facebook and Twitter are still predominantly used for marketing and public relations, providing a platform for question and answer type interactions between the public and the museum. Little is known, thus, about the nature, scope and implications of this fast, but uneven uptake of social media in museums. Even less is known about applications and implications for museum learning. Hence, between the 'media advocates' and the 'media sceptics' of this sector, there is room for detailed empirical evidence on

whether and how museums, learning and ‘social media’ intersect and how web 2.0 technologies could be integrated in museums’ learning programmes for schools.

This study addresses this lack of empirical research by focusing on the following research questions:

- How do young people’s interactions on Twitter help them to engage meaningfully with museum content and make sense of their experiences? and
- How are group postings translated into meaningful learning trails which may have dialogic potential?

This study investigates the ‘quality’ of the interactions among young people on Twitter during a visit to the Museum of London (<http://www.museumoflondon.org.uk>) to understand the characteristics of this type of communication and identify areas where learning occurs. It also seeks to understand whether interpretation is facilitated, to recognise the elements that give rise to learning and eventually enrich the learning experience in such an environment. More generally such understanding will enable us to use this new medium to its full potential but specifically, the aim is to provide guidance to the museum sector for effective use of these tools in facilitating learning within school programmes.

Studies in Web 2.0 technology are often based on multi-disciplinary perspectives and thus identifying appropriate research methodology posed some challenges for this study, in particular developing a strategy for evaluating the nature of interactions and the quality of the learning experience with Web 2.0 technologies during the museum visit. Although interaction and conversation are key elements in social media sites, finding “interesting conversations to read is often a challenge” (Chen et al. 2011). Also, while there is an excess of (social) content on social media sites, there seems to be a lack of frameworks and tools that allow us to exploit such information.

The research questions are addressed by drawing on studies on museum learning, and especially the Contextual Model of Learning developed by Falk and Dierking (2000). The study also draws on recent work on using social media and specifically Twitter.

The following section provides a brief account of earlier research conducted in the field of museum learning, including studies in technology enhanced museum learning, alongside recent research in the use of social media in educational settings.

Literature Review

Museum learning

Museums offer a distinct context for learning, where learning is conceptualised as the construction of meaning rather than the acquisition and transfer of information. Meaning is made from one's own experience "through a constant process of remembering and connecting" (Silverman, 1995, p. 162), assimilating and integrating one's experiences into new ways of understanding, thinking, and acting (Rennie & Johnston, 2004, p. 7). Key to museum learning is interactions with and about authentic artifacts through which meaning is constructed.

Assessing learning in a museum is problematic (Walker 2006), partly because learning is a developmental and continuous process (across time and space) and partly because each museum experience is unique, has multiple influences and multiple outcomes. Earlier research on assessing learning in museums has been criticized for employing methods and strategies often employed in formal settings (e.g. classrooms) and thus not fully addressing the complexity of the museum context (Griffin, 2004). Hence, new methods of investigations have been introduced to address students' socially negotiated learning behaviours during field trips and the interaction between learning in the classroom and in the museum. This shift in museum education has afforded a deeper understanding of the nature of learning in these contexts (ibid).

A significant body of work investigating the meaning making that is revealed through visitor conversations was carried out by the Museum Learning Collaborative (MLC) (Leinhardt, et al., 2002). MLC work puts conversation at the core of museum learning, as both the process and the outcome of museum learning. This approach is in alignment to a sociocultural perspective, where conversation is the primary activity through which knowledge is co-constructed and through which new knowledge is appropriated (Mercer 2004). However, most of the MLC research focused on family-visitor conversations, and therefore there is a need to address the social interactions operating within school groups.

The last decade has also seen increased research into the use of digital and mobile tools to support museum visits (Vavoula et al. 2009; Walker, 2006). These tools facilitate inquiry activities in the museum such as exploration, information search, communication, and experience documenting (Hsi, 2002). Research on the impact of social media on informal learning in museums suggests that social media has a significant role to play in creating authentic learning experiences based on social networking and knowledge sharing around collections (Russo et al., 2009). Similarly, initial evaluation of the National Museums Online Learning Project (NMOLP)

demonstrates the potential of networked cultural information as a resource towards learning (NMOLP, 2009). However, research on the educational effectiveness of digital technologies in museums is limited (Falk & Dierking, 2008, p.28).

Use of social media in education

A major category of social media activity is social networking. Social networking websites (e.g. Facebook, Myspace) attract millions of teenage users (Nielsen, 2009) and have become an essential part of college students' lives (Junco et al., 2010). Although research on using social media sites is still emerging, few of the studies published explore the link between using such sites and education (Elavsky et al. 2011; Selwyn 2009) and K-12 education remains under-researched. This paper presents an empirical study to fill this gap.

There has been an increasing body of research investigating Twitter and its integration in the learning process (Grosbeck & Holotescu 2008; Junco et al. 2010). The advantages of microblogging, according to Ebner et al. (2010) consist mainly in the possibility of giving immediate feedback and in documenting processes (p. 94). Grosbeck and Holotescu (2008) expand on the possibilities of using microblogging in educational contexts. Junco et al. (2010) examines the effect of Twitter on college students' grades and engagement, showing that Twitter can be used to help engage students in the learning process. Similarly, Elavsky et al. (2011) investigate the impact of Twitter in a general education lecture course, which they suggest is "multi-faceted, unpredictable, but generally positive" (p. 15). An important aspect of this work, is the mixed-methods approach in analysing the data. Each method gives valuable insights into what is the added value of using Twitter in the classroom, especially in terms of the dynamics of the social setting and also "how such technologies enhance our potential to achieve pedagogical goals therein, namely extended engagement with and the development of student thinking" (p. 15).

In what follows, the analytical framework, an account of the study and some preliminary findings from the analysis of the online discourse will be discussed.

Framework

Contextual Model of Learning

Falk and Dierking (2000) investigated the contexts in which this learning takes place and identify twelve suites of factors² within three contexts which they consider crucial for museum learning. They developed the ‘Contextual Model of Learning’, where the visitor/museum experience is conceptualised as the interaction of the personal, the social and the physical contexts. This model takes into account what visitors bring with them to the museum (personal and social context) and the characteristics of the museum as a setting (physical context). Importantly, the visitor is viewed as being actively engaged in the construction and reconstruction of these three contexts, in a process that is shaped by time.

Drawing on the Contextual Model of Learning, this study focuses on the social context of the visit without neglecting personal and physical contexts. It is based on the assumption that using social media tools for learning purposes might enrich social context and thus, through social interactions and social construction of knowledge learning will be advanced.

Research Methodology

This study uses a qualitative research framework and selects the case study method as an appropriate research method to investigate how museum school visits can be enhanced by using social media. Several research techniques for data collection were employed. A summary is provided on the Table 1 below.

(Table 1 here)

Table 1: Summary of the methods employed for data collection

Methods for data collection		
Pre-visit	Visit	Post-visit
pre-test questionnaire	observation (notes, pictures, video)	post-test questionnaire
personal meaning map	online posts on Twitter (text and pictures)	personal meaning map

² Personal Context: motivation and expectations; prior knowledge, interests, and beliefs; choice and control.
Sociocultural Context - within-group social mediation; facilitated mediation by others and cultural background and upbringing and
Physical Context - advance organizers; orientation; architecture and large-scale environment; design; reinforcing events and experiences outside the museum.

Methods for data collection		
online posts on Twitter	pictures/video captured by participants	online posts on Twitter
classroom observation	audio files from each group	self-report videos about visit
video files	booklets	classroom discussion about the visit
		video collages on Vuvox
		semi-structured interviews

This paper focuses on the analysis of the online discourse on Twitter and interview data and discusses preliminary findings.

The study

Description

The museum visit was designed around the theme ‘Get Up, Stand Up: Fight for your Rights’, which is related to the Key Stage 3 (KS3) Scheme of Work ‘Equality and Beliefs’. The study also included classroom-based sessions before and after the visit.

Participants

The participants were a Year 9 history class (13-14 years old) in a secondary school in Milton Keynes (in total 29 children).

Museum of London: A Rationale

Museum of London (<http://www.museumoflondon.org.uk/English/>) (MoL) was selected as the site of the study because the recently refurbished Galleries of Modern London provided appropriate links to KS3 Scheme of Work, since one of the themes in these galleries is the ‘Fight and Protest for your rights’. Beyond this, the MoL fulfilled some key criteria, including infrastructure (internet in the galleries and digital equipment e.g. digital cameras, iPods and iPhones) presence on the main social media platforms (e.g. Twitter, Facebook, You Tube) and the provision of learning programs with digital technologies.

Twitter: A Rationale

Twitter is primarily a microblogging platform, where every user can publish short messages up to 140 characters, so-called ‘tweets’. Twitter was selected for a number of reasons:

- recent research (Elavsky et al. 2011, Junco et al. 2010) has shown that it can be used as an educational tool
- Twitter has both synchronous and asynchronous attributes, and also introduces the possibility of enhancing the dialog ‘synchronically and diachronically’ (Elavsky et al. 2011, p.6).
- using Twitter would allow the researchers to collect participants’ reactions to what they experience at the MoL.
- simple interface (web and iPhone application) for use with teenagers
- updates in users’ status in the UK can be carried out using SMS, which means that it could be used even without a network in the museum during the visit.

A pilot study was then carried out and suggested that Twitter is appropriate for the purposes of this study.

Visit Plan

The participants were divided into eight groups (of threes or fours), according to their responses to a pre-test questionnaire (familiarity with new technologies and attitudes towards museums).

On arrival at the museum, each group was handed out a package which included a booklet, one or two iPhones (depending on the size of the group), one or two digital recorders with a microphone, information on sign-in on Twitter and an envelope with the group’s inquiry and log-in information on Vuvox (www.vuvox.com), a site which was going to be employed for creating a presentation after the visit.

Each group followed a pre-defined trail across the three Galleries of Modern London (Expanding City Gallery, People’s City Gallery and World City Gallery). Instructions about the trail and the activities were given to each group in the A5 booklet. However, up to a certain extent, participants could decide what to see and which objects to focus on. The group’s overall aim was to carry out some activities and collect some evidence in order to address an inquiry related to the visit’s theme (e.g. Which methods/means do people use to remove inequalities in society?) and to create a presentation. Participants could use either the Twitter or the Tweet Deck iPhone application. To ensure that all the participants could track the tweets during the visit, specific hash-tags were suggested (#muvi1, #muvi2 and #muvi3).

Overall, the average time spent in each gallery was 20-25 minutes. In between the sessions in the galleries, there was a session at the Clore Learning Centre, to upload the pictures, reflect on the visit and start working on the presentation.

(Fig.1 here)

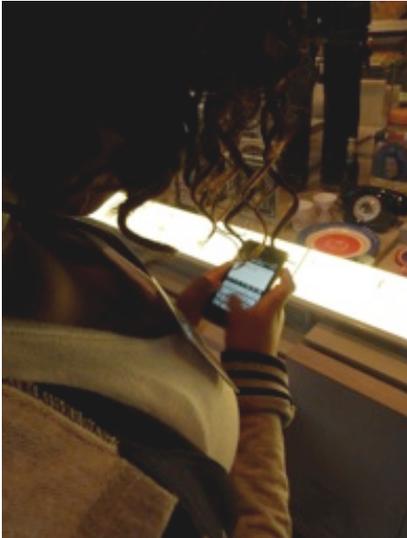


Fig. 1 A participant at the People's City Gallery

Analysis and Findings

The aim of this section is to provide an interpretation of the visit through:

- a descriptive numerical analysis of the tweets
- a representation of the online discourse as a semantic network of posts (De Liddo et al., 2011)
- the participants' personal accounts after the visit (semi-structured interviews)

Interpreting the visit through descriptive numerical analysis of the tweets

A twitter account was set up for the (@MuseLearn) and monitored by the researcher. A private list was also created (@MuseLearn/oak2011). All the participants (29) created an account and followed the project account and most were also following each other and the list.

Eighty four tweets were posted during the visit (on average 10.5 tweets per group - @MuseLearn not included) (Fig.2). These were classified into 9 broad themes that were identified in a first open-coding of the data (features of the tweet and content) (Table 2, Table 3). A high number (n=74) was related to the museum and its discourse, 11 were related to the trip, while only 1

was related to a participant’s extracurricular interests. All the tweets with URLs had a picture of a museum object posted online. Most of the tweets were original posts with only 9 of them being direct replies. More than half were linked to activities related to the aim of the visit. Finally, some tweets acknowledge that this is a collaborative activity (n=20).

(Table 2 & Table 3, Fig 2. here)

Table 2 Number of tweets according to a specific category

Themes	Number of tweets
Context (posted in the museum or on the bus)	81
URL (in tweet)	14
Hashtag (in tweet)	31
Related to museum and its discourse	74
Related to the trip (issues/management/logistics)	11
Related to participants’ extracurricular activities/interests	1

Table 3 Number of tweets according to type, task and social dimension

Category	Type			Task (according to trip’s aims/ group’s inquiry)			Social dimension		
	Original Post	Retweet	Reply	On task	Off task	Not applicable	Us/we/our	I/me	Not applicable
Number of tweets	74	1	9	55	25	4	20	6	58

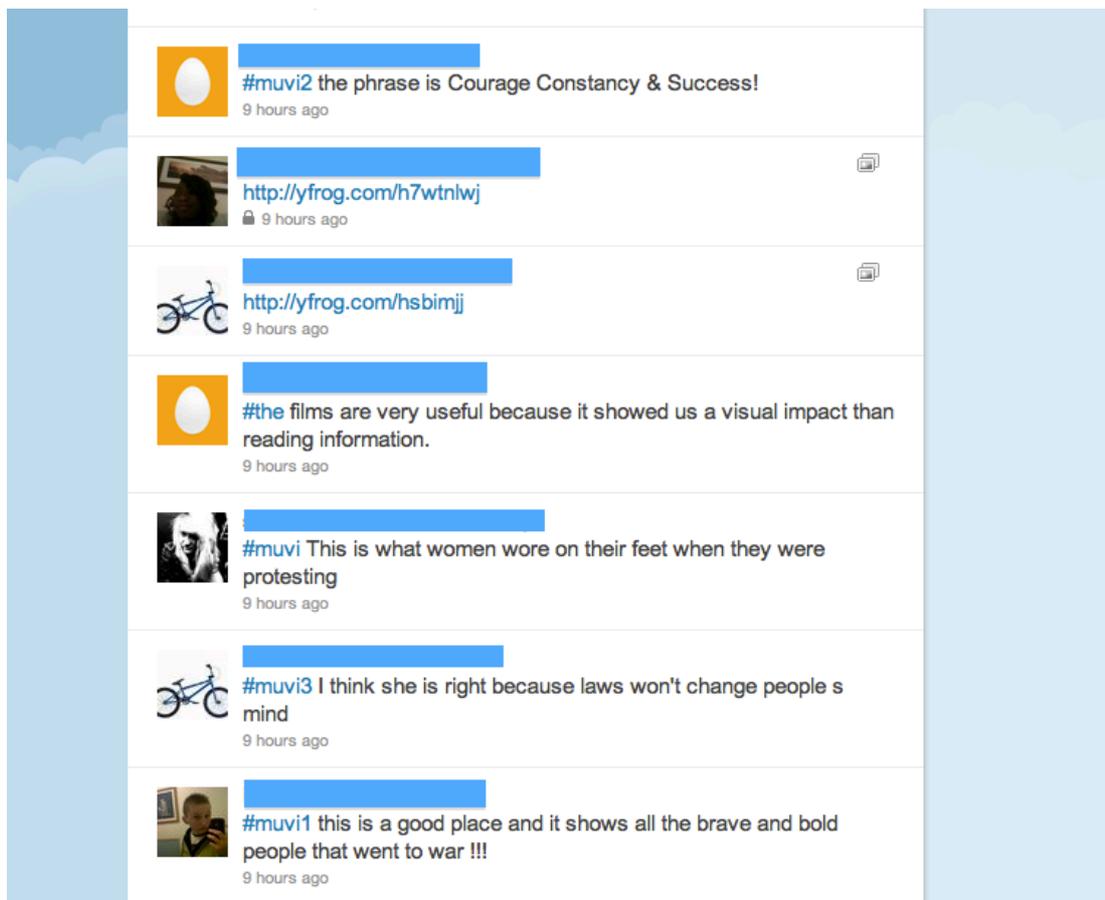


Fig. 2 Tweets posted during the visit

Interpreting the visit through mapping the tweets

In Twitter online discourse is rendered chronologically, rather than logically. This reflects and attributes importance to the time sequence of the contributions rather than their conceptual structure. Hence, it is difficult for users to track key issues raised in the conversations (e.g. ideas, arguments, questions) or the links attached to the tweet and thus to contribute to the conversation without reading the entire online conversation, clicking on links and being able to filter the ‘noise’. The same difficulty applies when analysing and trying to make sense of the online discourse on Twitter. Hence, the approach followed here to analyse the tweets is to structure and represent the discourse as a semantic network of posts, as proposed by De Liddo et al. (2011, p. 6).

In this approach each post is coded according to its function in the conversation (node/post type) and is connected to a specific post or participant, according to the function of the post and its place in the conversation (semantic connection/link type). With this method and by looking at the post types one can evaluate learner’s performance connecting the discourse outcomes with the specific learning goal. The link types, classified as positive, neutral or negative, provide indicators of the attitude learners have towards the learning task and the conversation. The focus of the

analysis in this paper is on the post types and the contribution they make in the online discourse.

For mapping the tweets the Compendium was used (<http://compendium.open.ac.uk/>).

Compendium is a software tool for mapping information, ideas and arguments. Fig. 3 below shows a map of all the tweets posted by the seven groups on the day of the visit. They are clustered around a group icon, as the unit of analysis is the group and the interactions among the groups.

(Fig. 3 here)

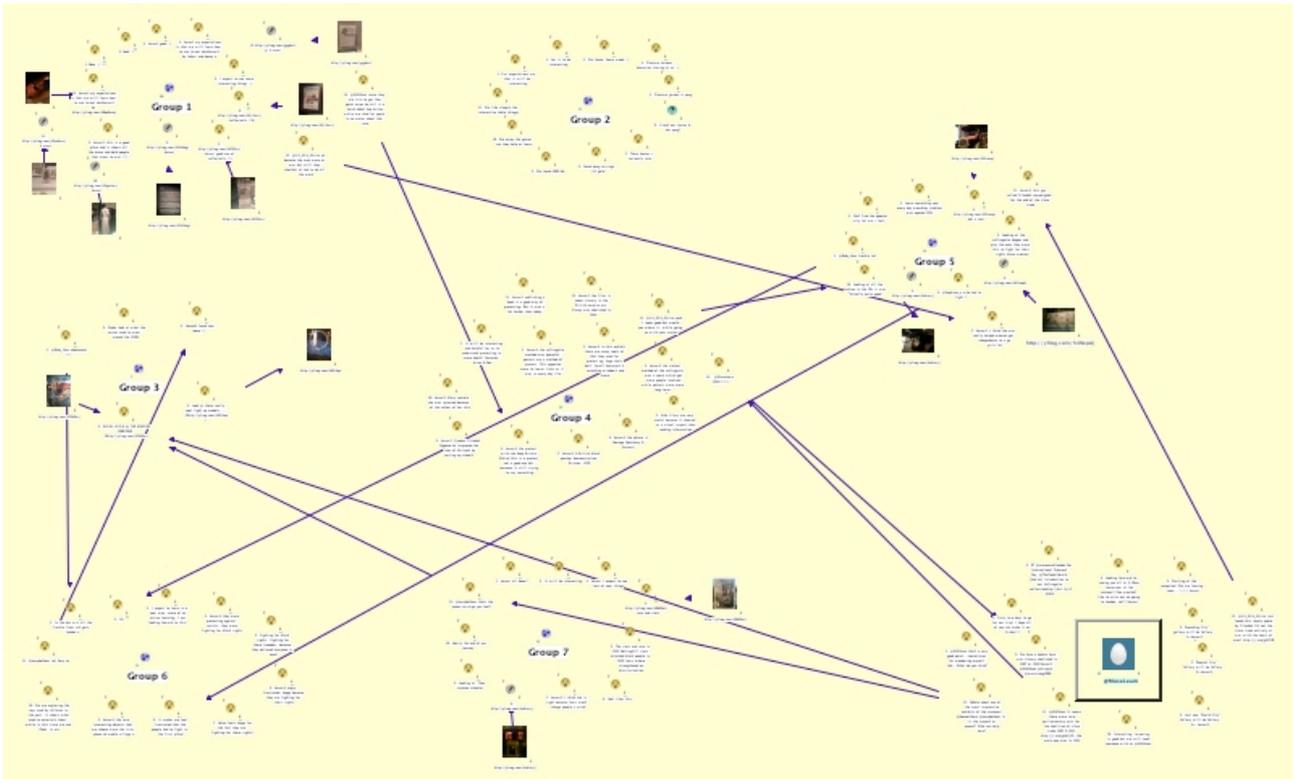


Fig. 3 Network of the tweets

This network shows the seven groups that participated in the study and the researcher (icon in that last row, right). The pictures posted online (see URLs in Table 1) and connections between the groups can be seen. The graph shows that six groups posted on average a similar number of tweets (apart from Group 2). Also, there is only one group without any connections to other groups (Group 2). The connections are limited and all represent direct replies. Where tweets are linked to other tweets, they tend to consist of a single exchange (comment-reply) without further exchanges, as shown by the fact that some tweets are linked to other tweets, but are not linked back.

The following section will focus on two nodes of this graph (Group 4 and Group 5).

Examples

The analysis of the tweets was carried out to identify the precise role of the tweets in the wider online discourse. The post type, as noted earlier, is one of two discourse elements suggested by De Liddo et al. (2011). Due to the limited number of connections (link types) (Fig.3) these are not examined below.

Group 4 and Group 5 are selected for an initial analysis of their tweets for two reasons:

- they shared the same inquiry during the visit (How do people change the societies they live in?)
- they posted similar number of tweets (n=14 and n=12 respectively).

Each of the 26 tweets is coded according eleven characteristics that emerged from the data (Table 4). Apart from enumerating how often these characteristics appear in each tweet per group (Table 4), a table which illustrates the process with specific examples is also provided (Table 5).

Table 4 shows that Group 4 was largely on task, providing answers to some of the questions in the booklet and looking for evidence for their inquiry, as opposed to Group 5. Group 4 was contributing information, all related to the theme of the visit, as well as evaluations and interpretations of their own ideas and opinions. By contrast, Group 5 contributed a high number of tweets giving examples or expressing feelings or describing their personal experiences. One can also note the lack of questions and judgments or reflections.

To conclude, Table 4 gives a picture of the type and quantity of contributions to the conversations that each group has given and hence, it may enable conclusions to be drawn about each group's performance in association with specific learning goals. However, this is a preliminary analysis, thus examination across all the groups is necessary to identify similar patterns with the two groups already analysed.

(Table 4 & Table 5 here)

Table 4 Characteristics: Function of the tweets in the online discourse

Code	Characteristics	Description	Count	
			Group 4	Group 5
RES	Responsive	on task (<i>according to their inquiry & booklet</i>)	12	5
INT	Interpretive	providing an idea, opinion or description (<i>it might characterise the tweet as a whole</i>)	5	2
INF	Informative	providing information (<i>e.g. dates, names</i>)	9	5
		<ul style="list-style-type: none"> • <i>thematic (related to the theme of the visit)</i> • <i>general information</i> 	9	2
			0	3
EVA	Evaluative	evaluating opinion, comment, action, picture	8	3

Code	Characteristics	Description	Count	
			Group 4	Group 5
InT	Interrogative	asking questions	1	1
JUD	Judgmental	expressing agreement or disagreement	1	0
ARG	Argumentative	justifying information, opinions or actions, giving reasons	4	0
ILL	Illustrative	giving examples (<i>incl. picture posted online</i>)	2	6
EXP	Experiential	expressing personal experiences (<i>e.g. looking, touching</i>)	1	4
AFF	Affective	expressing feelings	4	4
REF	Reflective	providing a reflection on ideas, actions or the experience, being thoughtful	1	1

Table 5 Examples of tweets

1	[Looking at all the fashion in the 70s] [it was actually quite good]	EXP	EVA	INT
2	@xxxxxxxx [yeah] [I looks good] but [would you where it, while going ou with your mates!]	JUD	EVA	InT and AFF
3	#muvi1 [publishing a book is a good way of protesting]. [But It was a lot harder than today].	RES	EVA	EVA INT
4	#muvi3 the protest with the ['keep Britain White'] [this is a protest not a good one] [but someone is still trying to say something]	RES	INF	EVA INT
5	[Learn something new every day] [wembley stadium was opened 1923]	REF	ILL and INF	
6	#muvi1 [I think the war really helped women get independence] so [u go girls lol]	RES	INT	JUD and AFF
7	[http://yfrog.com/h23rovpi dat a taxi]	ILL		
8	5. #the [films are very useful] [because it showed us a visual impact than reading information]	RES	EVA	ARG and EXP INT

9	@xxxxxxx [who had to fight]?
RES	InT

Interpreting the visit through participants' accounts

Interviews with 11 participants were conducted after the visit using a semi-structured approach and lasting approximately 15-20 min. In analysing the interview data thematic analysis was employed. Here, accounts from 3 groups are provided (n=5) to give insights on whether use of and interactions on Twitter, helped the participants to engage meaningfully with museum content and make sense of their experiences.

The participants were first asked to recall previous school visits to a museum. What is evident from their responses is the notion of a 'museum as a formal and boring institution' with characteristics, arguably, resembling a formal education setting:

“[...]We went into the museum and write everything down and have massive clipboards, with all the paper...” (Maria)

“It was boring, really boring...we didn't have much freedom, we had to be with a teacher, you were not allowed to go anywhere, to touch anything, to interact...” (Sara)

The interviewees were then asked to describe and express their views about the recent experience. All agreed that this was a very positive and engaging experience:

“...it was a lot more enjoyable because it was really focused and you could actually learn about something...” (Neil)

“[...]We were really into it...with that everyone stayed on target...” (Maria)

Specific questions were also posed about the use of mobile phones during the visit. Here, two themes emerged: first, the notion of the technology assisting in getting ideas and interpretations across, thus creating an 'opinion space', where multiple opinions could be heard. Second, the notion of being connected and staying connected, creating an 'inter-connected space', bridging the different (physical) spaces of the museum. The following quotes demonstrate these points:

“I like that...cos you go to see other people’s opinions...I mean, like, if you look at something, as I look at something, I see different things, so you can see how they interpret it. And I like the fact that you were staying in touch with everyone, even though they were not there...People tweeting about what they were seeing and you kinda know what is there, without being there...”(Nana)

“you answered some things on iPhone and other people got to read it, so they would be faithful to your opinion and faithful to the difference...so again, got to see other people’s opinions [...] We were in groups, but I was feeling connected with other groups, so we were all sharing ideas over internet...we were really into it...” (Maria)

“...some people don’t have the confidence to put the hand up and talk about what they’ve seen. With the technology they could write it down...and I saw a lot of people write down some really good ideas and maybe the use of technology could help them get their point across” (Sara)

There was also evidence also provides evidence that the participants were reading each others tweets during the visit. One of the interviewees said:

“when we saw the tweet about the carriage...we wanted to go and find it!” (Kevin)

while another said,

“You know about the Black Panther? cos when we were at the museum I tried to find it, I couldn’t find it...and then I saw the pictures and ‘Ohhhh, that’s what it is!’ So, then I learnt about this thing”.

Interviewees were also asked about the value of having this activity whilst at the museum and having comments posted online. Two of their comments were as following:

“With the tweeting, although you can learn with a pen and a clipboard, but when you think about it...you get lots of opinions on what you’ve posted, forming judgments, and the best part of it, even if you don’t use it that much, you can get some more information, particular items you are interested in and search about it” (Neil)

“You could go back at it and look through it and then just see different opinions...that’s the most important thing, looking, like everyone has an opinion, so do you...and it’s interesting to see what people put...if there’s something you didn’t see...” (Nana)

Beyond this, it seems that use of Twitter helps the participants to ‘archive’ and possibly extend their museum experience, which otherwise would be disposable:

“Without technology you wouldn’t have remembered it and looking back at them when you can” (Sara).

To conclude, this section presented interview data from five of the participants. The next section discusses the findings from the study.

Discussion

This paper has presented a study carried out at the Museum of London, which was concerned with how school visits to museums can be enhanced by using social media. This visit was interpreted using three different approaches. First, a descriptive numerical analysis of the tweets; second, through creating a network map of the tweets, combined with an analysis of two nodes of the map; and third, through participants’ accounts during the interviews. Each approach contributes important insights into the relationship between Twitter use and the implications for museum learning.

The first approach demonstrates that the participants were engaged with the museum and its collections and to a certain extent with the activities they carried out, also evident in the interview data. Almost all their tweets were related to the museum and its discourse (Table 2). This is particularly important given the nature of the visit; a self-directed visit, with teenagers equipped with internet connected mobile phones, and yet none of the participants contributed any ‘noise’ to the online discourse, about any of their extracurricular interests. So, it could be argued that at a primary level, social media tools can be used in museums for engaging students to participate and share their experiences. Griffin (cited in Griffin, 2004, p. 64) stresses the need for students to share their learning with classmates and this is where social media can contribute. Further, appropriate use of Twitter by students shows that integration of social media in learning activities does not lead to students misusing them, as ‘media sceptics’ in the education sector claim.

The second approach shows that representing the online discourse as a visual map offers a useful way to engage, explore and reflect on that data. Apart from the methodological implications

of this approach, it also contributed some insights into the participants' interactions. Fig. 3 suggests the posts are disconnected which might indicate disengagement from the learning task or the conversation. It might also indicate that the groups experience difficulty in moving towards shared viewpoints. Further, it seems that the Tweets have a monologic character, consisting of group postings loosely bound by the participants' experience at the museum. However, what this map cannot show, is any 'invisible interaction' taking place with participants reading the tweets and 'interacting' with the content and artifacts, without posting a comment or replying. The interview data showed that this second level of interaction took place and entailed dialogic features; with one's self as a reader, within and across the group once posts were read, with the objects and the institution and a broader audience which could potentially read the contributions. This 'invisible interaction' supported the negotiation and exchange of meaning making among the participants and shaped their collective experience at the museum. According to Wells (1997)

“meanings are also strongly influenced by the connection made by participants to related experiences, both personal and collective. These exist on several time scales: within the current activity/discourse; within the participants' individual and collective's experience of similar or related activities in their community; within the history of the activity in the culture more generally. Some of these connections concern the content of the activity; others related to the 'ground-rules for participation (cited in Ash, 2002, p.395).

In this particular discourse, the participants were “undergo[ing] quite profound changes...by engaging in joint activity and conversations” (Edwards and Mercer 1987, p.19) in an online space, which they had not previously experienced, at least not in the context of a museum visit. As the interview data showed, this enhanced the social dynamics of the visit and arguably the social context (Falk and Dierking, 2000). The participants were sharing an “interconnected opinion space”, not bound by the time scales of the visit, where pictures, opinions and interpretations were posted and 'archived'. This space and the activity on it helped them, to a certain extent, to engage and negotiate with museum content and make sense of their experiences and the learning agenda of the day. However, the particular tool and context (Twitter/online space) also shaped their interactions and quality of discourse, as this is dependent “on the specific knowledge base, experience and negotiation strategies” (Ash, 2002) that the participants brought with them.

Thus, by looking at the specific characteristics of the online discourse, the value of the Twitter interactions is limited: they are not particularly interesting and there are no multiple exchanges. The participants shared information, not always related to visit theme, and contributed some evaluations,

interpretations and feelings. They were doing all these, without questioning or being reflective or using a specialised vocabulary for describing objects, which restricts the meaning-making process (Charitonos, 2010). So, although participants felt engaged and said that they could speak up more freely than in a classroom or a traditional museum visit, yet, clearly, they did not have the appropriate strategies to negotiate content or the rules for participation, as Wells (1997) noted. Hence, the use of Twitter during the visit resembled the ways the participants normally employ in social media sites and inevitably, a tension between the physical context and content and the mediation tools (Twitter and language) was noted.

Finally, Ebner et al. (2010) claim that microblogging assists in the documentation of processes (p.94). Indeed, Twitter helped the participants to document their experience, and thus to leave a trace. Unlike the earlier experiences they had, the experience could be 'revisited' once this visit was over. New encounters with the online discourse, depending on what each person/user will bring (the personal according to the Contextual Model of Learning) alongside old and more recent visitor contributions (the social according to the Contextual Model) will shape and re-form the experience they had at the museum. The experience may be enhanced in that way and may consequently lead to an enhanced-shared understanding and potentially to new learning trails.

Conclusions

This study aimed to contribute insights into how use of social media tools during a museum visit could enhance the museum learning experience. The paper specifically looked at how the participants experienced the visit through their tweets and examined what they contributed and the nature of their contribution to the online discourse.

The analysis suggests an engagement with Twitter, which improved students' impressions, participation and enthusiasm during the trip itself. It also showed that the online interactions helped in the negotiation and exchange of meaning making among the participants and shaped their collective experience at the museum. However, the quality of the interactions was too restrictive for the participants to reach an enhanced shared understanding.

It should be noted that that the paper presents some initial analysis and preliminary findings and hence, further analysis is ongoing. Also, we acknowledge the fact that introducing new technologies into a social setting can affect methodological assumptions and practices (Hine, 2005, p.3) and can impact the broader dynamics of the social formation itself (Elavsky et al. 2011) and this may be a limitation for this investigation.

To conclude, the relationship between social media and their implications for museum learning needs to be further explored. Also, the challenge of developing more effective pedagogic strategies that will anticipate and encourage the ways that young people use such technologies and collaboratively construct meaning is yet to be addressed. Future research in this area, such as Web 2.0 technologies and its 'promise' for learning, will position us better to extract and exploit social information and making sense of it.

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