A real-time emergency response scenario using Web 2.0 (Yammer) technology

RESEARCH ARTICLE

A real-time emergency response scenario using Web 2.0 (Yammer) technology

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Abstract

Web 2.0 technologies, such as Facebook, YouTube and MySpace, are freely available web-based applications commonly associated with information sharing and community activities, as well as user-centred design. The social networking capability of Web 2.0 enables group activities and academic interactivity, and offers networking opportunities between tutors and students. This paper reports the research findings of a case study seeking to evaluate student perceptions of incorporating a Web 2.0 micro-blogging tool called Yammer into teaching. This involved closed group discussions facilitating a real-time emergency response scenario for an eruption of Mt Vesuvius. The scenario involved students role-playing as a 'Hazard Analyst Officer", responding to the changing environmental and social information provided before and during the eruption. Staff played a role as key stakeholders in the communications pathway. The student experience was quantified through questionnaires and focus group methodologies to capture the student voice. Feedback suggests that students using Yammer found it stressful, but realistic, and they valued the learning experience. However, a number of challenges remain to be addressed centred on the quantity of web traffic, working individually and tailoring the assessment away from the quality of blog postings.

Keywords: real-time scenario, hazard management, Yammer, mixed methods, Web 2.0 technology

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Planet, Vol 27, Issue 2 (December 2013)
doi:10.11120/plan.2013.00005

Introduction

The Department of Geography and Development Studies at the University of Chester currently runs an undergraduate Natural Hazard Management programme. A key mandate of this programme is to expose students to contemporary and innovative natural hazard management techniques and principles. Whilst there are standard methods and tools for understanding hazardous processes, the dynamics of understanding, managing and responding to hazardous (natural) situations can be difficult for students unless these are operating in a real-life scenario.

There are two ways for students to gain such experience; firstly by seeking a placement with civil contingency organisations during natural disasters, and secondly by participating in the simulation of a real life, real-time, natural hazard response scenario (Alistair *et al*. 2010). The first can prove difficult for students on a rigid modular programme, as currently exists at the University of Chester. The spatial location and timing of hazardous events act as major constraints - students cannot readily take up a placement, which would disrupt their studies, if and when a natural hazard occurs. In addition, civil contingency organisations are reluctant to have undergraduate students participate in 'real life' hazard response situations when, in some cases, critical life-threatening decisions need to be made. The second option of creating a real-time hazard simulation scenario in which students can participate is a much more practical, feasible and realistic solution to developing a decision-maker with valuable experience in hazard management and response (Pessina & Meroni 2009).

The potential benefits of 'real-time' hazard response scenarios include the ability to:

1. introduce students to real-time (changing) hazard situations, to which they have to apply their theoretical knowledge and prior experience in order to respond appropriately;
2. enable students to gain an understanding of the importance of making critical decisions in a timely and accurate manner;
3. enable students to utilise available resources (e.g. maps and GIS) at their disposal for decision making;
4. enable an understanding of the importance of effective risk communication, which is vital in hazard response situations; and
5. provide students with the experience/ confidence to participate in a real-life response situation (through either voluntary placements and/or employment).

Undergraduate students on the Natural Hazard Management programme at the University of Chester study volcanic hazard processes, management and responses in their final year of study. The students visit the Bay of Naples, Italy, in the first term of the academic year to gain an understanding of the spatial/temporal distribution of volcanic episodes and their underlying causative processes, their societal impacts, and the steps and processes involved in emergency planning. Students undertake an in-depth volcanic study of Mt Vesuvius and Solfatara. One of the challenges for planners in this region is how to effectively respond to and communicate volcanic hazard risk, should such a hazard become a reality in the future (the last volcanic eruption occurred over 60 years ago). A key part of the Chester programme of study is to introduce students to volcanic disaster response and effective risk communication.

Web 2.0 technologies in learning and teaching

Web 2.0 has been described as the 'Social Web' (Shirky 2003), which supports group interaction. The ease and ability to communicate using such technology is appealing to academics, students and businesses alike. Bill Gates said "*social networking-type applications will become as ubiquitous in the workplace as Microsoft Office tools and will likely replace email as the dominant form of corporate communications*" (Yellowfinbi 2011, p3). Most importantly, Web 2.0 tools are innovative online applications which aid communication and collaboration and are already highly familiar to today's students (e.g. Facebook and YouTube). Indeed, Prensky (2001) describes current students as 'digital natives', who generally associate with, and readily want to use, such technology. This is a growing area of research (Hughes 2009), but practitioners still require case study examples demonstrating how technology, and particularly Web 2.0 tools, can be effectively integrated into teaching practice (Lynch *et al*. 2008, Hill *et al*. 2012). This paper seeks to provide just such a case study example, exploring student experiences and attitudes towards the use of micro-blogging in hazard response simulation.

Yammer is one of many Web 2.0 technologies that may be utilised in learning and teaching, such as role play and simulation exercises. The benefits of this tool are that it is freely available and the interface is similar to most social networking sites used by students, such as Facebook. It was developed for corporate communication and, as such, operates as a closed system, limiting communications within specified groups.

Figure 1 Google Earth imagery of Mount Vesuvius and the surrounding area (Image copyright Google Earth (2011), reproduced under Fair Use Policy).

This paper evaluates the effectiveness of Yammer through a mixed-methods analysis of student learning experiences in a real-time emergency response simulation. The simulation was located in a core FHEQ Level 6 (final year) undergraduate module. The objectives of the research were:

- to evaluate student perceptions and learning experiences of incorporating Yammer into the curriculum;
- to assess the applicability and suitability of Yammer's application within a teaching context.

The emergency response scenario: Pre-'real-time' simulation

The hazard assessment response scenario was based on a hypothetical eruption of Mount Vesuvius (see Figure 1). The communication tool used for the real-time hazard response scenario was Yammer. Prior to the 'time constrained' real-time natural hazard/disaster scenario, students were informed about hazard processes, management and communication, and trained to use appropriate technology by undertaking a number of specific learning activities. These included the following activities.

- Help students develop a sound grounding in volcanic hazard processes through seminars, lectures and fieldwork.
- Enable students to develop their knowledge, experience and skills in the use of the communication tool (Yammer).
- Enable students to develop their knowledge, experience and skills in effective risk communication strategies (e.g. communication protocol and pathways) (see Figure 2) and disaster response scenarios.

The emergency response scenario: 'Real-time' simulation

The task given to the students (n=11) was: '*Using the communication tool (Yammer) for this simulation exercise, drawing upon your existing knowledge of volcanism in the Bay of Naples, Italy, and the associated resource pack, provide appropriate responses to questions/queries from the relevant individuals/organisations*'. Students were familiarised with the communication tool (Yammer) and the simulation process one week before the actual simulation.

The real-time simulation took place over a 45 minute period and incorporated three phases; pre-eruption planning (e.g. three months before pending volcanic eruption), pre-eruption (e.g. days before possible eruption) and active volcanic eruption. The simulation exercise formed part of the module's summative assessment, with students assessed based on a number of criteria including: timeliness of their responses, accuracy of responses (e.g. correct interpretation of seismic data, prioritising of areas to evacuate) and adherence to communication pathways (see below). All students were given the role of 'Hazard Analyst Officer' (see Figure 2) and assigned to one of three sectors around the Mt Somma-Vesuvius volcano, for which they were responsible. Each student worked at their own computer terminal over the 45 minute period. Students were told the role of other personnel who would participate in the scenario (e.g. Scientist, Natural Hazard Emergency Manager and member of the public), which were played by

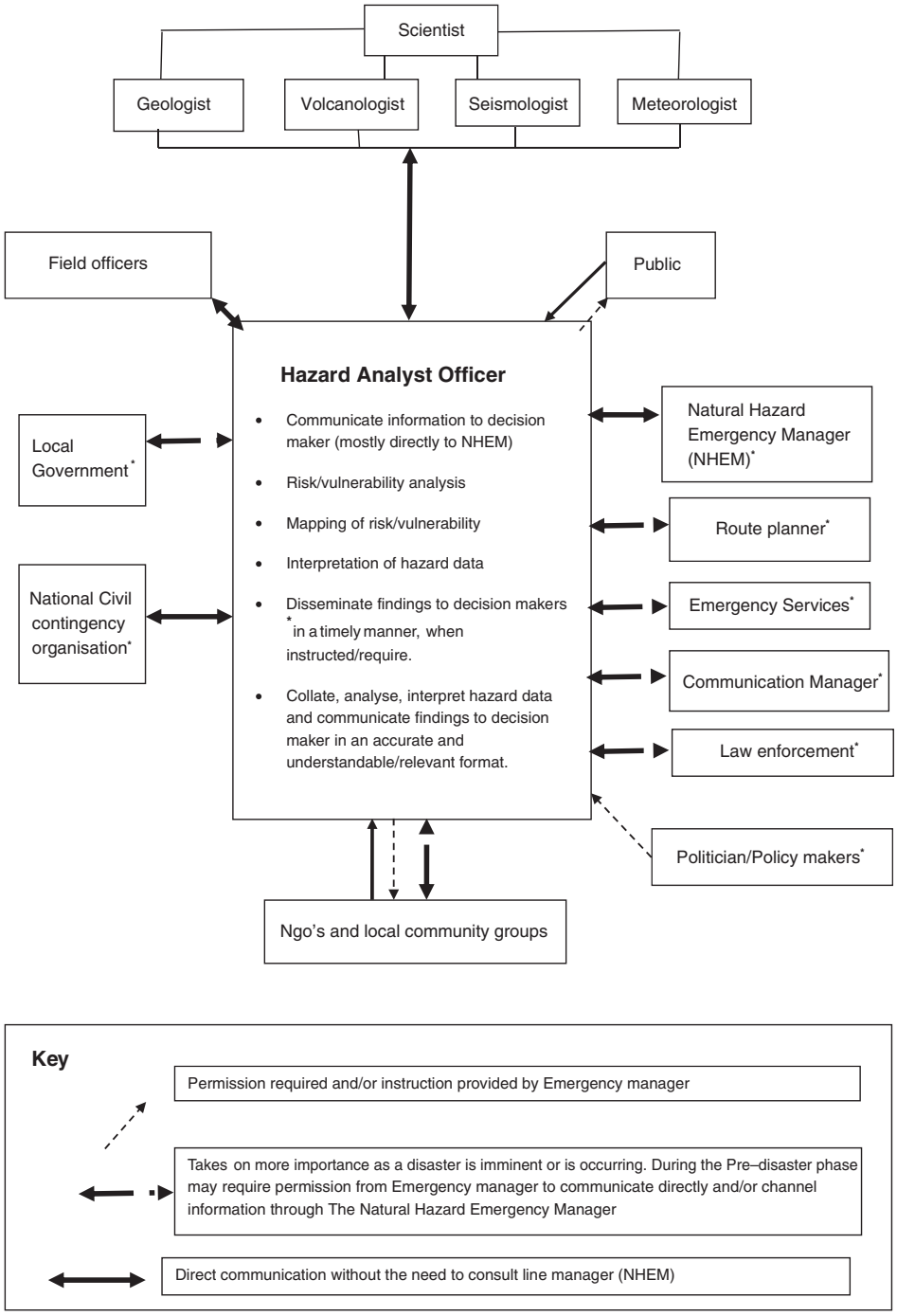

Figure 2 Communication pathway and role for Hazard Analyst Officer (nb: pathway and protocol may vary depending on the organisation).

tutors. Before the start of the simulation exercise, students were provided with a resources pack (see Table 1) to help inform their decision making during the simulation exercise. Although the students were familiar with, and had used, most of the resources provided before the real-time simulation, each student was given further time to re-familiarise themselves with the pack. Geographical Information Systems (GIS) and Internet resources were also made available should the students choose to utilise these. As students were meant to be in different geographical locations in the scenario, they were not allowed to communicate verbally with other classmates (Hazard Analysis Officers) in the room. However, there were no stipulation that they could not communicate with each other using the communication tool (Yammer) provided for the task.

The simulation exercise was divided into three phases: Phase A – Pre-eruption, one month before eruption; Phase B – Pre-eruption (Warning level) one day before eruption; and Phase C (Alarm level) – volcanic eruption in progress. The tutor in charge

Table 1 Resources provided to students for the 'real-time' simulation.

1.	Emergency plan for the Bay of Naples
2.	Communication pathway/protocol and role for Natural Hazard Analyst Officer (see Figure 2)
3.	Emergency evacuation zones for Vesuvius and surrounding areas (draped over satellite imagery)
4.	Simplified geological map of the area around Somma-Vesuvius
5.	'Explorist' event tree for Vesuvius (probabilistic characterizations of possible future eruptive scenarios at Vesuvius volcano are explored and discussed) (see Neri *et al*. 2008).
6.	Ash fall and Pyroclastic flows scenario
7.	Topographic map for the Bay of Naples

indicated when each phase started. During the course of the simulation, questions/queries were posed by tutors acting as: Natural Hazard Emergency Manager/s; a member of the public; a politician; and a scientist (see Figure 3). These questions were all posed and answered by students using Yammer.

Student Evaluation

This paper draws upon the responses of a pilot group of 11 students, focusing on their learning experiences of using Yammer in a real-time simulation (5 females and 6 males). Data were gathered through a bespoke pre- and post-questionnaire and a focus group. The

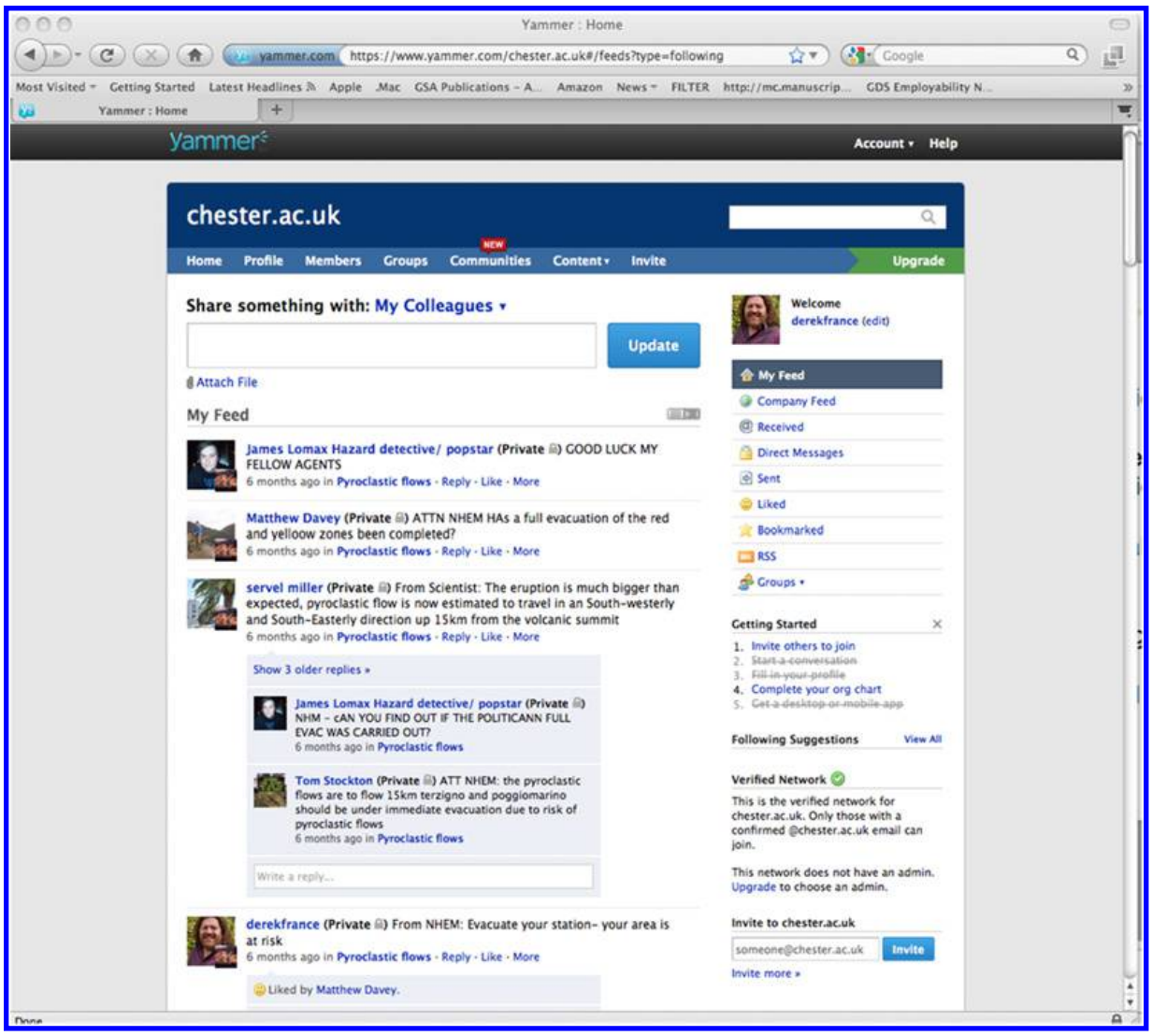

Figure 3 Typical Yammer communications log (Yammer 2011) which students may use in their reflection and which was used as part of the assessment.

pre-questionnaire gathered the students' previous experiences of communication technologies and sought to capture how they felt about their own competency with technologies. The post-questionnaire aimed to capture the students' views on the simulation using Yammer and how this impacted on their personal learning experience. Surveys were anonymous, using a matching code to track how any individual's opinion had changed. The response rates to the surveys were high, at 100% pre- and post-simulation. A focus group was carried out after the simulation using volunteers (n=11) and it interrogated in further depth the main discussion points that arose from the questionnaire responses: this included talking about the students' concerns over using the technology and their interactive engagement with the subject matter.

Results and discussion

Prior experiences and expectations of students

The data collected from the pre-questionnaire highlight the students' prior experiences and competencies with social networking software. All students were members of at least one social networking site and regularly used Short Message Service (SMS). Only two students reported that they were inexperienced at micro-blogging. This suggests the students' perceptions of their competency with social networking and SMS use was similar, but some variability exists with regards to expressing themselves in block text formats. Students expressed their expectations of using Yammer in a more qualitative format on the pre-questionnaire, with 73% of responses communicating either reservation or trepidation. The students were asked what they were looking forward to least about the simulation and their responses focussed on the mechanics of using Yammer:

> ***"The [blogging] congestion through multiple messaging"***
>
> ***"Using Yammer! It's slow especially on the University network"***
>
> ***"I am worried about the amount of text traffic"***

These statements contrast with the positive anticipation of using Yammer in a real emergency response scenario:

> ***"A different way to communicate"***
>
> ***"An assessment – with real life pressure"***
>
> ***"Having to respond in real time"***

Although students were provided with practice exercises using Yammer before the real-time simulation exercise, the most frequent concern from students was the lack of prior experience of using Yammer as a communication tool. This is an area that the teaching staff reflected on and will address for future simulation exercises.

Post-questionnaire and focus group responses: Emerging themes

Three themes were identifiable from the post-simulation questionnaire and they were supported by the focus group discussion. The students regarded the simulation exercise as a memorable experience, from the frustration of waiting for the exercise to start, to the realism once underway and the stress experienced during participation. Their thoughts are exemplified by the quotes below:

> ***"A stressful experience"***
>
> ***"Stressful but realistic"***
>
> ***"The organisation of the event. . . waiting around for a couple of hours until our group did the simulation" (focus group)***
>
> ***"It was good and realistic. . . I was just was not very good at it" (focus group)***

The second theme that emerged was one focusing on student anxieties, including issues pertaining to external distractions and the speed of their blogging responses during the simulation [reflecting limited keyboard skills], illustrated by the following comments:

> ***"Not typing fast enough"***
>
> ***"I had a big coursework assessment in the day after [the simulation] so I felt I couldn't focus fully on Yammer" (focus group)***
>
> ***"Another assessment deadline meant I just couldn't concentrate" (focus group)***

There has been much research highlighting the benefits of using technology to engage students and to enhance learning (see Owen *et al*. 2006, Becta 2009, Holotescu & Grosseck 2009, Hughes 2009, Miller & France 2012). The benefit of using an emerging technology (Web 2.0), which was familiar to students and readily utilised in their day-to-day activities, was the final theme. Student comments included:

> ***"It [Yammer] relates directly to the digital age. We need more of this type of assessment" (focus group)***
>
> ***"A different type of assessment which made use of the skills [SMS] I already had"***

Figure 4 A 'word cloud' representing the three words that best describe the students' perceptions of using Yammer (The most frequently cited words are in a larger font size. Words captured from written questionnaire, n=33 words from 11 students.)

As part of the evaluation, students were asked to summarise their overall learning experience related to the simulation exercise using three words The most common words were stressful, different, interesting, exciting and interactive (Figure 4). The innovative nature of the exercise was also highlighted. These words demonstrated a range of emotions felt by the students during the simulation. Emergency response situations in real life are a stressful experience for participants and it was good that real-time simulation captured this element:

> ***"It [the simulation exercise] demonstrated a real-life hectic scenario"***

However, the stressfulness of the activity seemed to be due, in part, to the mechanics of monitoring and posting blog updates, as well as responding quickly and effectively with pertinent information to stakeholders' questions and updates. This is evident in statements such as:

> ***"the computer keeps freezing. . .and could not post comments on time.. frustrating"***
>
> ***"I just can't type that quick"***

Whilst the exercise may have being stressful to students, they did find it interesting and exciting as reflected in the statement:

> "***More fun with interaction; good way to learn***"

Lessons learnt

As this was a pilot exercise, and the teaching team was contemplating using the assessment and/or learning activity, it was important to reflect on the findings. Valuable lessons have been learned regarding the simulation exercise process itself, preparation for the exercise, use of the exercise as an assessment, the (in)adequacy of computing facilities, students' interaction/lack of with each other and the communication tool itself (Yammer). The recommendations outlined below will be implemented with subsequent cohorts of students.

- Students should work in pairs or small groups rather than as an individual, with one student consulting the resources pack, discussing their findings with their partner(s), and another student responding using Yammer.
- The high level of 'web traffic' (over 100 blogs postings per session) meant a short delay in receiving messages consistently in a timely manner. The staff will consider decreasing the number of questions posed.
- The duration of the exercise should be increased from 45 minutes to 1hr.
- Whilst the use of Yammer was introduced two weeks before the real-time simulation exercise, students believed this was insufficient. As such, Yammer should be introduced much earlier to students - at least at the start of the module. This will give them more time to use it to communicate with each other and become more familiar with Yammer as a communication tool.
- Change the assessment of Yammer away from the quality of the blog postings to individual reflections on the process of using blog postings as reflective evidence. This will bring the assessment focus to the role of being a Hazard Analyst Officer and away from the operations of Yammer.

Conclusions

As tutors, we are encouraged to incorporate interactivity as part of the teaching and the learning process to enable students to better engage (Mutch 2003). The use of 'action learning' helps students to gain a better understanding of the processes through which they learn, resulting in them becoming more engaged with the learning process (Johnson 1998). As stated by White (2000, p153), "the highest form of interactivity is achieved by incorporating 'dialogue' into the learning process". The simulation exercise offered both interactivity between students and staff and, to a limited extent, between students and students. The preliminary analysis of the results from student feedback highlighted that they engaged well with the simulation exercise.

The challenge of introducing a new type of assessment, which tries to facilitate a hazard simulation event in a controlled environment, was

demanding and rewarding for both staff and students alike. Whilst students found the experience stressful, they also believed it was exciting and helped them to better understand critical decision making during an emergency response situation. One of the over-arching aims of this final year Natural Hazard Management module (of which the simulation exercise was a part) is for students to gain the confidence to be critical thinkers, and the simulated exercise contributed to this. An important finding from this 'pilot' exercise is that staff are reminded not to underestimate the 'lead-in time' when students are introduced to, and become familiar with, the use of new Web 2.0 technologies. Although the majority of students are highly experienced in Web 2.0 technologies, when using them for an unfamiliar task they need much more than the two weeks preparation time to become familiar with the software.

The micro-blog postings from the stakeholders (e.g. Scientist, Natural Hazard Emergency Manager and a member of the public) and the responses by the Hazard Analyst Officers in this simulation created a large volume of blog postings for students to evaluate. A more manageable scenario would be for students to work in a pair or in small groups.There is the possibility for future exercises to extend group interaction to allow students to discuss the simulation as individual teams before the simulation exercise and then to reflect on their performance afterwards. In this way, students will be better able to learn from each other. As stated by Fry *et al.* (2009), where students are given the opportunity to learn from each other and reflect on their experience this helps to build confidence and better enables them to engage with the learning process. When students take ownership of their work this is more likely to result in deep learning (Race 2007).

The initial trepidation and lack of experience in using Yammer were not reflected in post Yammer evaluations. However, there was one unexpected concern, which related to the timing of the simulation event within the academic calendar (clash with other assessment deadlines), and this is an important consideration that needs addressing for the effective running of any subsequent simulation exercise.

Acknowledgements

The authors thank the Natural Hazard Management staff and students at the University of Chester who have contributed to this work, the Higher Education Academy for providing a grant for this research, and Victoria Powell for her diligent proof reading of the manuscript.

References

Alistair, M., Gemmell, D., Finlayson, I. and Marston, P. (2010) First Steps Towards an Interactive real-time hazard Management Simulation. *Journal of Geography in Higher Educating* **34**, 39–51.

Becta (British Educational Communications and Technology Agency) (2009) *Software and Internet analysis: Micro-blogging in education*. Available from: http://www.teachfind.com/becta/printer-friendly-software-and-internet-analysis-web-20-education-key-stages-three-and-four-2 (accessed 22 October 2013).

Fry, H., Kettridge, S. and Marshal, S. (2009) *A Handbook for Teaching & Learning in Higher Education: Enhancing Academic Practice*, 3rd edn. London: Kogan Page.

Google Earth (2011) http://www.google.com/earth/index.html (accessed 12 March 2013).

Hill, J., Nelson, A., France, D. and Woodland, W. (2012) Integrating podcast technology effectively into student learning: A reflexive examination. *Journal of Geography in Higher Education* **36**, 437–454.

Holotescu, C. and Grosseck, G. (2009) Using microblogging in education.Case Study: Cirip.ro Proceeding of the 6th Conference on e-Learning Applications, Cairo, Jan 2009. Available from: http://www.scribd.com/doc/8551345/Using-microblogging-in-education-Case-Study-Ciripro.

Hughes, A. (2009) Higher Education in a Web 2.0 World (Bristol: JISC). Available from: http://www.jisc.ac.uk/publications/generalpublications/2009/heweb2.aspx (accessed 3 April 2012).

Johnson, C. (1998) The essential principles of action learning. *Journal of Workplace Learning* **10** (6/7), 296–300.

Lynch, K., Bednarz, B., Boxall, J., Chalmers, L., France, D. and Kesby, J. (2008) E-learning for geography's teaching and learning spaces. *Journal of Geography in Higher Education* **32**, 135–149.

Miller, S. and France, D. (2012) Developing a Web 2.0 technology for hazard response simulation. *Higher Education Academy STEM Annual Conference paper 2012*. Available from: http://www.heacademy.ac.uk/assets/documents/stem-conference/gees/Servel_Miller_Derek_France.pdf.

Mutch, A. (2003) Exploring the Practice of Feedback to students. *Active Learning in Higher Education*, vol. **4** (1). Institute for Learning and Teaching in Higher Education and SAGE publication.

Neri, A., Aspinall, W.P., Cioni, R., Bertagnini, A., Baxter, P.J., Zuccaro, G., Andronico, D., Barsotti, S., Cole, P.D., Esposti Ongaro T., Hincks, T.K., Macedonio, G., Papale, P., Rosi, M., Santacroce, R. G. and Woo, G. (2008) Developing an Event Tree for probabilistic hazard and risk assessment at Vesuvius. *Journal of Volcanology and Geothermal Research* **178**, 397–415.

Owen, M., Grant, L., Sayers, S. and Facer, K. (2006) *Social Software and Learning*. Bristol, UK: FutureLab. Available from: http://www2.futurelab.org.uk/resources/documents/opening_education/Social_Software_report.pdf (accessed 22 October 2013).

Pessina, V. and Meroni, F. (2009) WebGis tool for seismic hazard scenarios and risk analysis. *Soil Dynamics and Earthquake Engineering* **29**, 1274–1281.

Prensky, M. (2001) Digital Natives Digital Immigrants. *On the Horizon* **9**, 5. MCB University Press: http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf (accessed 6 April 2013).

Race, P. (2007) *The Lecturer's Toolkit: A Practical Guide to assessment, Learning and Teaching*, 3rd edn. London: Routledge.

Shirky, C. (2003) Social software and the politics of groups. *Networks, economics and culture mailing list [online]*, 9 March 2003. http://shirky.com/writings/group_politics.html (accessed 8 March 2013).

White, S. (2000) Using technology for teaching and Learning. In *A Handbook for Teaching & Learning in Higher Education: Enhancing Academic Practice* (eds. H. Fry, S. Ketteridge, and S. Marshall). Kogan.

Yammer (2011) https://www.yammer.com/ (accessed 12 March 2013).

Yellowfinbi (2011) Social and collaborative Business Intelligence http://www.yellowfinbi.com/YFSalesDocs.i4?cat=white (accessed 8 March 2013).