Research in Learning Technology
Vol. 24, 2016

ORIGINAL RESEARCH ARTICLE

'I can use things, but I can't make anything': a qualitative exploration of team networks in the development and implementation of a new undergraduate e-compendium

A. Latif*, R. Windle and H. Wharrad

School of Health Sciences, Queen's Medical Centre, University of Nottingham, Nottingham, United Kingdom

(Received 17 June 2016; final version received 3 September 2016)

In higher education, undergraduate teaching materials are increasingly becoming available online. There is a need to understand the complex processes that happen during their production and how social networks between different groups impact on their development. This paper draws on qualitative interviews and participant drawings of their social networks to understand the dynamics of creating a new e-compendium for a four-year online undergraduate nursing programme in Norway. Twenty staff interviews were undertaken to explore views of the e-compendium, the development process and the perceived networks that were formed during this course. Interview data were thematically analysed along with networks drawings. The findings showed three main institutional stakeholder groups emerging: the 'management team', 'design team' and 'lecturers'. Analysis of social networks revealed variability of relations both within and between groups. The pedagogical designer, who was part of the design team, was central to communicating with and co-ordinating staff at all levels. The least well connected were the lecturers. To them, the e-compendium challenged and even threatened previously well-established notions of pedagogy. Future development of e-compendiums should account for the perceived lack of time and existing workload of lecturers so they may be involved with the development process.

Keywords: e-compendium development; social networks; qualitative study

Introduction

Undergraduate online courses and e-compendiums are increasingly becoming commonplace and offer students' convenience, flexibility and empowerment over their learning (Lymn, Bath-Hextall, and Wharrad 2008; Wharrad *et al.* 2001; Windle *et al.* 2011). Undergraduate nursing students have reported satisfaction with such online learning materials (Mancuso-Murphy 2007; Korhonen and Lammintakanen 2005). Academic staff also have broadly positive attitudes and value the pedagogical importance of technology in teaching and learning (Blake 2009). However, more detailed investigation reveals that there are likely to be a range of views from those that are advocates to those who are sceptical, hesitant or lack confidence in e-learning teaching developments and delivery (Blake 2009; Dariel 2011). One reason for this is that lecturers themselves typically undertake the writing, format and presentation of

*Corresponding author. Email: Asam.Latif@nottingham.ac.uk
Responsible Editor: Fiona Smart, Edinburgh Napier University, United Kingdom.

Citation: Research in Learning Technology 2016, **24**: 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

undergraduate course materials. However, when courses migrate online, many simply do not possess the skills to develop and manufacture e-learning materials. An example of the complexity can be seen in the screenshot from one such e-compendium shown in Figure 1. As a result, a team-based stakeholder approach is used to develop the e-materials (Alexander 2001; Gwozdek *et al.* 2011). Whereas beforehand lecturers worked solely to produce their learning materials, this new team may include flash developers, graphic design, text writers and audio commentators (Eseryel and Ganesan 2001). This model can be a challenge for lecturers as they make the transition from independence (i.e. autonomy over producing their teaching material) to a collaborative model, where they relinquish the format and presentation of the material so that this can be constructed online (Meyen, Tangen, and Lian 1999).

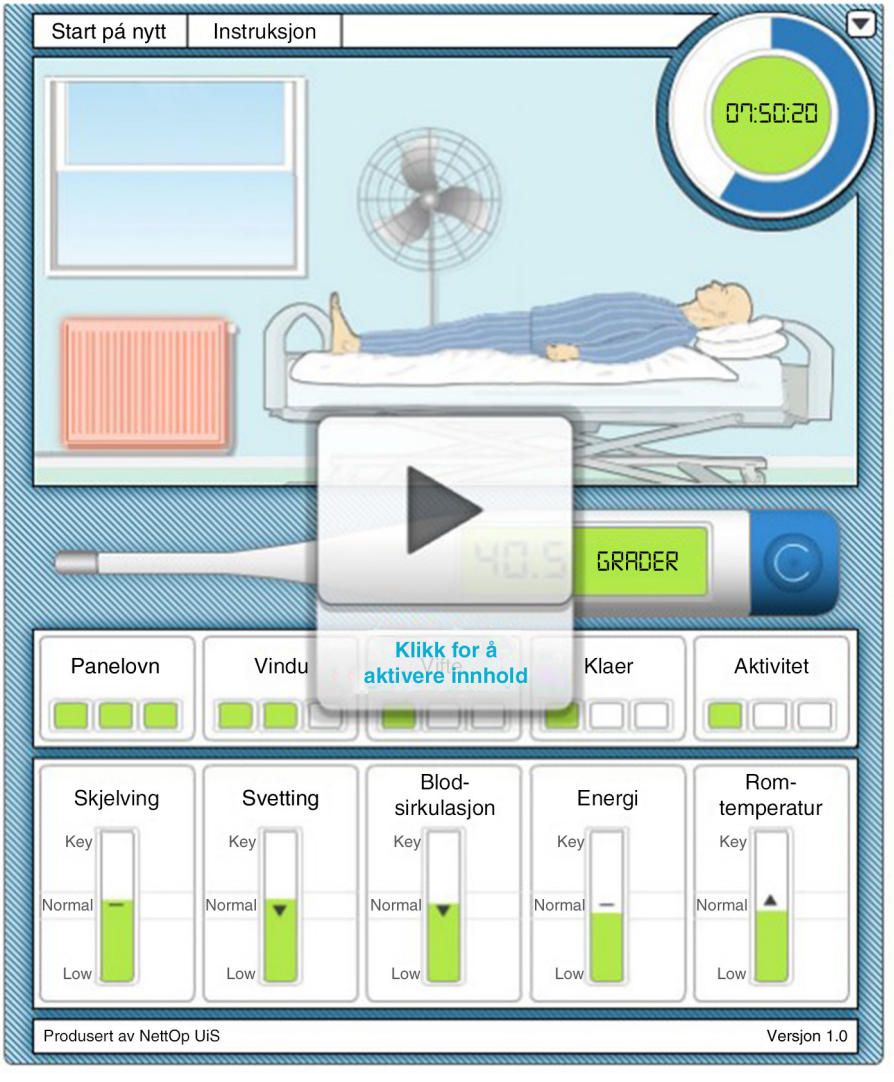

Figure 1. Example screenshot of an e-compendium. The topic of this particular student exercise is management of fever. The activity is of an interactive nature adding to the complexity of e-compendium.

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

To avoid potential tensions that can arise between lecturers and those who develop and produce online material, a team-based approach is needed (Shephard 2004) as well as a detailed understanding of the social networks that are formed during this process. This study uses stakeholder interviews and illustrations of social networks to understand this process. Drawing on a Social Network Analysis (SNA) approach (Scott 2000) to extend the thematic analysis, the nature and consequences of ties between individuals or groups were investigated. SNA has been described by Wasserman and Faust (1994, p. 3) as focusing on *relationships among social entities and on the patterns and implications of these relationships*. SNA is based on the assumption that relationships have a large impact on influence and decision making and that a map of such relationships will help to identify where networks are resilient or vulnerable. This approach has been used in the social sciences in a variety of settings. For example, in healthcare, SNA has been used to explore health care professional relationships and networks (Keating *et al.* 2007; Lewis, Baeza, and Alexander 2008). In education, the method has been used to evaluate programs that aim to improve schools by fostering greater collaboration between teachers (Penuel *et al.* 2006) and understanding how learning relationships form in undergraduate classrooms (Grunspan, Wiggins, and Goodreau 2014). There has been little research investigating the social networks that develop at the time when online course material is being manufactured and developed and the involvement of teaching staff during this process. This study draws upon a 'real world' example and aims to provide insight into the shape of these new social networks that are formed during the creation of online resources.

Methods

This study took place in a University in Norway as part of an evaluation of a new e-compendium for an online undergraduate nursing programme. The project was undertaken by independent evaluators from the University of Nottingham (HW & RW). All University staff members who were involved in the project to develop the multimedia PDF-based online e-compendium were invited to face-to-face interviews. Seventeen interviews were held in Preikestolen during a staff development weekend in September 2009. Three lecturers were interviewed at a University in Norway in September 2010 giving a total of 20 interviews. Each participant was given a code in order to maintain anonymity (Table 1).

At the start of their interview, participants were provided with a sheet of A0 paper and pens in order to illustrate their relationship with others in the project team and outside. Examples of illustrations that were drawn are given in Figure 2.

All participants were then asked to discuss their involvement in the creation of the e-compendiums and social networks developed during this process. Also explored were barriers and facilitators, any support and training they received, quality assurance issues and personal and perceived levels of control over the process. In addition, lecturers were asked about their existing teaching methods, their confidence and previous experience of e-learning (see Appendix 1 for interview topic guides). Interviews lasted between 10 and 30 minutes. With consent, interviews were audio-recorded and transcribed verbatim.

Table 1. Roles and assignment of staff members working on the project.

Participant code	Role within the team	Centrality (In-degree)	Centrality (Out-degree)
A1	Design team: Artist – Computer illustrator	3	3
A2	Design team: Artist – Traditional illustrator	2	2
D1	Design team: Developer (provided vocal commentary)	9	9
D2	Design team: Developer	6	6
D3	Design team: Developer	6	6
D4	Design team: Developer	8	8
D5	Design team: Developer	7	7
D6	Design team: Developer	7	11
EL	Design team: European link (business administrator involved in funding e-learning projects)	0	0
PD	Design team: Pedagogical designer	17	12
M1	Management team: Manager	6	5
M2	Management team: Manager	10	9
M3	Management team: Manager	11	12
T1	Teaching staff: Lecturer	7	7
T2	Teaching staff: Lecturer	5	5
T3	Teaching staff: Lecturer	4	5
T4 + M	Teaching staff: Lecturer (but also included management responsibility)	9	9
T5	Teaching staff: Lecturer	0	1
T6	Teaching staff: Lecturer	4	4
T7	Teaching staff: Lecturer	1	1

Data analysis

Once the interview data had been transcribed, this was imported into the qualitative analysis package NVivo 9. Each interview was read and the data were categorised using thematic analysis to produce anticipated and emergent themes. The social networks that were described during their interviews were further explored and analysis extended by using pictorial network maps to understand the relations between members of the team. The pictures that were drawn by the participants were

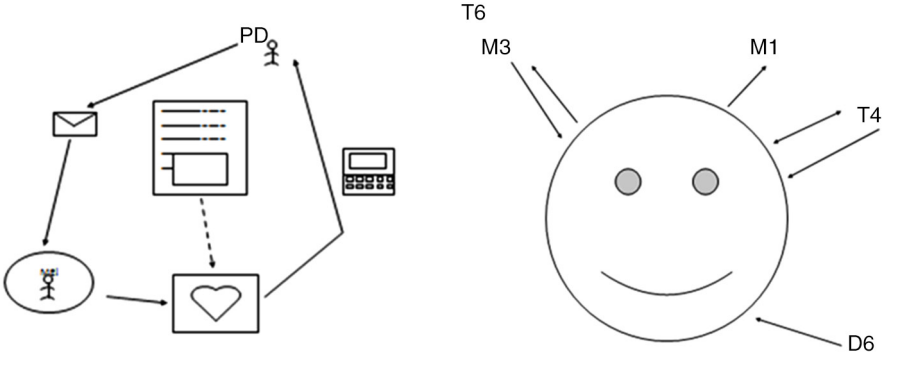

Figure 2. Anonymised example of pictorial network map produced by lecturer (T6) & illustrator (A2). Letters refer to other team members (M1 and M3 are project managers; T4 is a lecturer; D6 is a member of the development team and PD is the pedagogical designer).

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

initially deconstructed to a binary figure (0 = no contact; 1 = contact) to establish what relations there were between stakeholders. Two actors were said to be connected if they revealed this relationship in their interviews or on the networks they drew. The data on the reported ties between the actors were then inputted into the software UCINET (Borgatti, Everett, and Freeman 2002) for analysis. A positional approach was taken whereby the actors were identified through their formally defined position or group memberships (Scott 2000; Wasserman and Faust 1994). These were then represented visually using network maps (Sociograms) to further the analysis alongside interview transcripts.

Findings

Project team roles and networks

We categorised participants into three groups according to their institutional job role. A management team, design team and teaching staff (comprising of lecturers). The management team (M1, M2, M3 and T4 + M) were responsible for initiation of the project, recruiting and allocating tasks to others, taking decisions, monitoring output and quality as well as co-ordinating work between different staff. The management team also had important roles in liaising at all levels including organisations outside the university to ensure success of the new online course. The teaching team (T1, T2, T3, T4, T5, T6 and T7) were the lecturers and content writers. The technical design team (D1, D2, D3, D4, D5, D6, EL and PD) were based within the *Learning Technology Group*, which was the University's unit for web-based studies. The design team roles included a business administrator (EL), a pedagogical designer (PD), graphic designers, programmers, flash developers and text editors. This team was responsible for developing the digital materials from the manuscripts developed by the lecturers and uploading them onto university systems for access by students. Other contributors to the design team were freelance artists (A1, A2) based in the UK and Australia, who worked remotely.

Decision to develop the online nursing course and compendiums

When participants were asked about how the online course came about, they reported that this was due to growing institutional pressure to offer a nursing course off campus. This came at a time when there was a drive to develop e-learning digital media services related to broadband (Europa 2010). Another driver for initiating an online course was that the University had an experienced unit to produce web-based teaching materials. This led a perception from the lecturers that this was a 'top down' rather than 'bottom up' initiative. This created tensions between the teaching staff because the materials had to be developed on top of their existing workload:

> I find it frustrating because this is on top of all my tasks that I have at the institute (T2)
> I had to make [write] the compendium, it was on top of all my other jobs and I took personal time (T6)

Consequently, project managers initially found it challenging to make lecturers subscribe to the idea, but this became easier as the value of the project became more evident.

Working relationships and networks when developing the e-compendiums

Analysis of contacts that existed within the three groups showed that the management team had the most well connected group network. Figure 3 illustrates the internal connections within this group. Each line represents an interaction that was reported at interview or illustrated on the network maps drawn by participants (the greater number of ties indicates a greater degree of connectively within the team). As can be seen each member reports ties to each other member. A density measurement, which describes the level of linkage in a network, can be taken of any given network and involves the calculation of the actual number of contacts observed in a network as a proportion of the potential number of contacts in that network. The management network has a density of 1 (where all participants in the network are directly linked). The design team had a similarly well connected network (density 0.73). However, the teaching team (lecturers) was found to be the least well connected (density 0.24). Some (T5, T7) reported not being connected to others at all.

Two freelance artists were employed but worked remotely. Work was often given to them when there were resource constraints within the Learning Technology Group. However, they reported being unclear about how the team fitted together and the roles others had in the project:

> I knew very little about the project … I just assumed that it would be maybe someone putting their lecture notes online … I had no idea as to the scope of the project (A2)
> Of course not knowing how the images you create will end up sort of leaves a bit of uncertainty while you are doing the illustrations so any long term project like this becomes a learning curve in itself as well (A1)

The lack of ties to the freelance artists had some important implications for when work was given to these illustrators. Detailed analysis of the networks revealed that the PD was the gatekeeper to the external illustrators (A1 & A2). The PD's network was illustrative of a 'star' network where their positioning allowed them to network with all other actors (Figure 4). This was supported by the data which showed the PD to have the highest score for in-degree and out-degree centrality (Table 1). These measures determine the importance or how central an individual is in a network. A potentially powerful and an influential member of the network could be characterised as someone who both makes (out-degree) and receives (in-degree) numerous contacts.

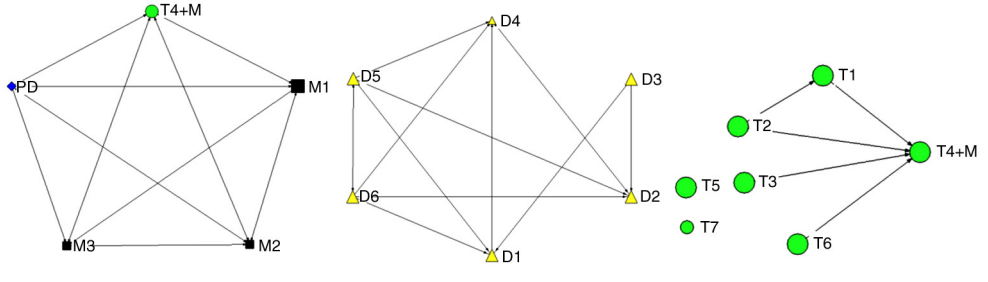

Figure 3. Network maps illustrating social networks. Management team includes members M1–3, the Pedagogical designer (PD), T4 + M = teacher with management responsibility. The Design team network includes D1–6 and the teaching network includes members T1–7.
Note: T5 and T7 are not connected to the teaching network as they reported no connections with other participants within the team, nor did others mention them during interviews or within their pictorial networks.

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

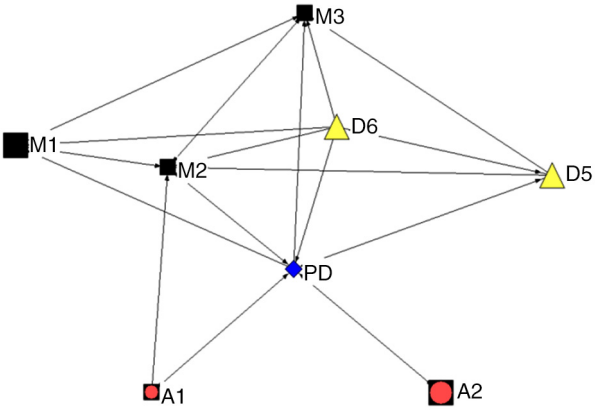

Figure 4. Sociogram illustrating ties between external illustrators (A1 & A2), design (D6, D5) and management team (M1–3) and the Pedagogical designer (PD).

Looking more closely at this network, if design team member D6 elects not to provide information to design team member D5, D5 still has a number of other contacts to receive this information. However, if the PD elects to not exchange with D5, then this information would not be conveyed to D5 at all. An example of this was described by one design team member (D5) when describing work that involved the freelance illustrators (A1 & A2). The lack of direct contact with the freelance illustrators constrained the workflow of participant D5:

> The only problems is that sometimes there is a waiting time for me because I got all the text ready but there's an illustration missing (D5)

Likewise, networks between the design team and the lecturers (who were based elsewhere) were also less well established. The design team members shared an office in the Learning Technology Group which allowed them to work closely together. However, the lack of direct contact with the lecturers meant their work was again constrained as they relied on the PD to communicate between them. This matter is illustrated in Figure 5. This sociogram reveals how D2's lack of network contact with the teaching staff made. As can be seen, D2 network with lecturers is limited making communication between them challenging. Again the PD played a key connecting role.

The management team worked closely with the design team and their day to day interactions meant problems could be resolved spontaneously:

> The Learning and Technology Group team I actually see face-to-face every day and we solve problems on a minute to minute basis ... (M2)

However, in comparison, the management team had less developed networks with the teaching staff (Figure 6). The lack of initial buy-in from lecturers and their poorly developed networks meant there was little engagement with lecturers at the beginning of the project:

> This project was decided by the management at university, it was not initiated by the staff itself ... So they didn't have any opinions about it, actually the other way around, they didn't believe in it basically (M2)

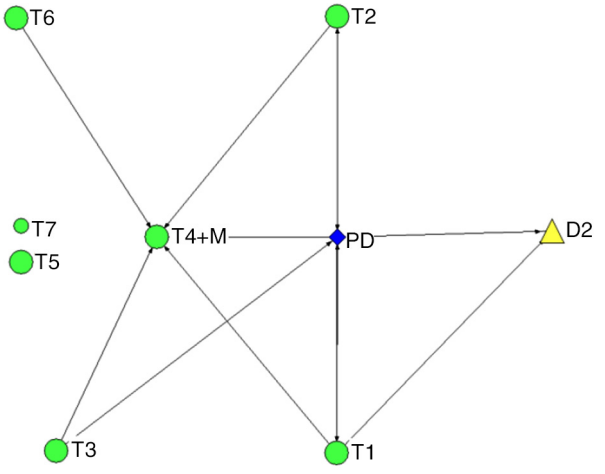

Figure 5. Sociograms illustrating D2 network map between lecturers.

The position of the PD within the networks meant that she was the least dependent on any other specific actor. The PD was conscious of the workload of the teaching staff and only contacted them when necessary. Nevertheless, there was an understanding that they could contact her when needed:

> I only contact them when I really need to but I'm always open for them to contact me anytime and it's a kind of two way thing but I'm trying to be economical with only telling them what they really need, especially when they start teaching again now (PD)

However, as will be looked at in the following section, the lack of engagement led to lecturers feeling disconnected with the project.

'Evolving pedagogy': implications for lecturers

The traditional methods of teaching described by lecturers included PowerPoint presentations which were made available online either before or after the lecture. A discussion forum was also available to students to share experiences and for lecturers

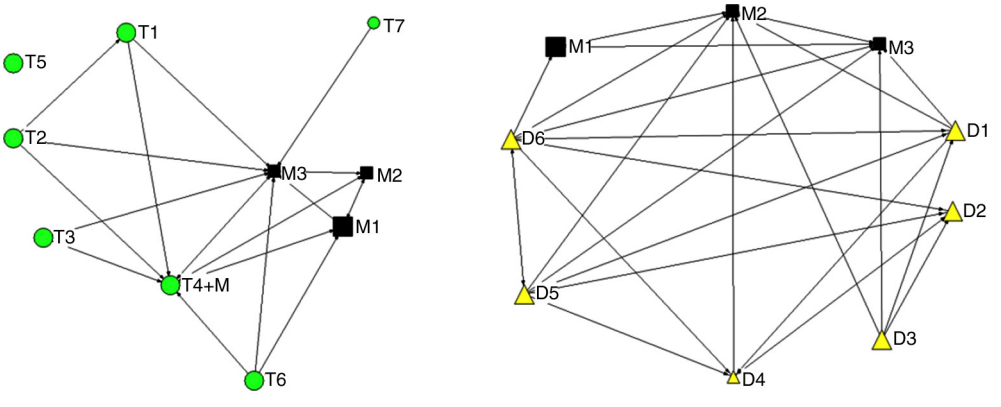

Figure 6. Sociograms comparing the networks between the management team and teaching/ design team.

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

to post multiple-choice questions. The lecturers reported being happy with these formats but were open to notions of newer teaching/learning methods. However, when describing the development process for the e-compendiums, the lecturers were not clear about this. The lecturers clearly saw their role as content writers using their existing lecture notes and PowerPoints as a basis for the e-compendiums:

> I started off with my lectures I already had and used the lectures I had in the subject. So that was sort of a start off point. And then I combined that with text book (T5)

There was little expectation from the lecturers themselves or other member of the project team that that they would need to be doing any technical development of the e-compendiums.

> No I'm not involved [with the technical development] and they shouldn't involve me at all. I can use things, but I can't make anything (T1)

All participants acknowledged the importance of understanding online pedagogy. However, lecturers mentioned there was no formal staff development on this and wanted development opportunities to learn more:

> I haven't had training yet, but I hope I can have it (T3)

Lecturers also felt they were working in the 'dark', not knowing exactly what was involved in developing the e-compendiums and importantly how long it was going to take. They were learning as they went along. Despite concerns about workload and speculation about how an online course was appropriate for a caring and profession such as nursing, many expressed satisfaction with the e-compendiums once produced and appreciated being part of the process.

> Yes I'm surprisingly content with everything, but I wasn't negative in the start like a lot of other people here, I've never been negative to it, but I'm surprised how well it has turned out and I believe it very much that this is also a good way to learn(T5)

Discussion

Studies about online learning have focused on the quality of the e-learning material, user perceptions or staff engagement (Bates 2011; Chen and Tseng 2012; Newton 2003; Ward, Peters, and Shelley 2010). Others have examined the impact of workload on lecturers and the time involved in engaging with e-learning teaching (Care and Scanlon 2001; Delgaty 2013; Minnaar 2013). However, multi-stakeholder analyses of social networks and the implications these have on those teaching through this format are under-reported. This study aimed to fill this gap and provides insights into the social networks that are created between those who teach the material and those who manage and produce them. The poorly developed networks with the teaching staff had the potential to challenge or even threaten previously well-established notions of pedagogy. This situation was further exacerbated by the 'top down' approach and lack of engagement of all staff at the start of the project. These findings supported findings from Connolly, Jones, and Jones (2007) who undertook a qualitative study exploring how a group of tutors involved in a major e-learning project reacted to developing and teaching in this new environment. In this study, it was found that all respondents

were keen to keep an element of face-to-face teaching in their modules and felt it was difficult to gauge the depth of learning of their students without this. The lack of communication about the potential value of the e-compendiums at the beginning of the project meant there was a lack of early buy-in from the lecturers. Furthermore, the lack of early involvement meant that lecturers had poorly developed social networks, not only between themselves but also with other members of the project team. This led to a sense of overall disengagement with the process of production, because they did not perceive this to be part of their responsibility. The role of the PD was found to be crucial in facilitating communication within the team. The PD was the best connected of all of the participants, was central to the project workflow and enabled dissemination of information to all subgroups to ensure the success completion of the project. Nevertheless, the reliance upon one individual to co-ordinate between the different groups, at times constrained effective workflow.

Several models have been proposed to facilitate engagement and 'project manage' online courses (Bates 2011, p. 68). One project management model depends upon individual team members contributing appropriate skills and knowledge to the project. This model has been described as advantageous to teaching staff, because the project manager can assume most of the administrative and bureaucratic duties thus freeing faculty to function as content experts. By examining the roles and relationships of the various stakeholders involved, administrators and educators can build a better model for future interdisciplinary distance course development. Likewise, another model known as 'care of practice' has been proposed by Windle and Wharrad (2010). This specifically encourages equity and collaboration within a multi-skilled workforce. However, this work showed that despite there being a well-connected management and design structure, the lack of effective network connections to the lecturers suggest disempowerment, with the lecturer role restricted solely to the technical writing of teaching material. Whereas, some may view this as advantageous because of the existing high workload, others may see this as a lost opportunity to actively utilise the pedagogical skills of lecturers during course development phase.

This study has important implications for those commissioning and managing online projects. Effective engagement with lecturers on decisions to develop online courses needs to occur at the onset to ensure all stakeholders are fully engaged and have the opportunity to input in the design and development process. Major (2010) observed that faculty members believe teaching online changes the way they approach and think about teaching, course design, time, instruction and students. Effective social networks need to exist if the experience of lecturers is to be fully utilised. For this to happen there needs to be early involvement and communication with lecturers. Furthermore, there was a noticeable lack of involvement with potential users of the material. The quality of the e-compendiums may be strengthened if students are included in these networks. The implications for lecturers include the need to be proactive and become accustomed to the new networks that will be formed when developing online courses. Resources need to be available to lecturers so that they can not only write the contents of the course material but also have an opportunity to input into the development process. Blake (2009) suggests that raising staff awareness of the potential of e-learning tools and on-going support and mentoring may be beneficial to improve staff involvement. This study suggests that if teaching staff

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

voices are to be heard during the design and development of online course material, they will need to be a concerted effort to upskill lecturers to ensure their input into pedagogy is effective and they are engaged at all levels to ensure successful implementation of the project.

Conclusion

Recognising the importance of how social networks with differing roles and skills are formed and managed is key to effective management of these challenging projects. This study aimed to provide such insights into the social networks that are created during the development of online learning material. Teaching staff need to be fully consulted on initiatives to migrate learning materials online to avoid challenging and even threatening previously well-established notions of pedagogy. Future development of e-compendiums should account for the perceived lack of time and existing workload of lecturers so they may be involved with the development process.

Strengths and limitations of the study

To our knowledge, this is the only study that has investigated social networks among different groups working on an e-compendium for an online nursing course. As such it provides novel insights into the social connections made during the production of e-compendiums. One limitation to this study is that interview accounts were used to collect data on the number of contacts within the network. The data are therefore open to limitations of recall bias of the respondents. Future studies that seek to use social network approaches should find ways to triangulate connections so the robustness of networks can be validated.

Conflict of Interest

HW and RW are members of the School of Health Science's Education and Technology for Health Research Group. AL declares no conflict of interest.

Ethical approval

This study formed part of a wider evaluation project so ethical approval was not deemed necessary. Nevertheless, all participants were fully informed about why the evaluation was taking place, were provided with a participant information sheet and written informed consent was taken before interviews. It was explained to all participants that they were free to withdraw at any time. Anonymous codes have been used in this paper to protect the identity of participants. The evaluation was conducted according to the British Educational Research Association (BERA) ethical guidelines.

Acknowledgements

The authors thank all the participants who took part in this study.

References

Alexander, S. (2001) 'E-learning developments and experiences', *Education + Training*, vol. 43, no. 4/5, pp. 240–248.

Bates, A. W. (2011) *Outlook for Online Learning and Distance Education*, Contact North, Sudbury Ontario, Canada.

Blake, H. (2009) 'Staff perceptions of e-learning for teaching delivery in healthcare', *Learning in Health and Social Care*, vol. 8, no. 3, pp. 223–234.

Borgatti, S. P., Everett, M. G. & Freeman, L. C. (2002) *UCINET for Windows: Software for Social Network Analysis*, Analytic Technologies, Harvard, MA.

Care, W. D. & Scanlon, J. M. (2001) 'Planning and managing the development of courses for distance delivery: results from qualitative study', *Online Journal of Distance Learning Administration*, vol. 4, no. 2. [online] Available at: http://www.westga.edu/~distance/ojdla/summer42/care42.html

Chen, H. R. & Tseng, H. F. (2012) 'Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school lecturers in Taiwan', *Evaluation and program planning*, vol. 35, no. 3, pp. 398–406.

Connolly, M., Jones, C. & Jones, N. (2007) 'New approaches, new vision: capturing teacher experiences in a brave new online world', *Open Learning*, vol. 22, no. 1, pp. 43–56.

Dariel, O. P. (2011) *Exploring E-learning Adoption in Nurse Education: A Socio-cultural Case Study Using Q and Bourdieu*, Doctoral dissertation, University of Nottingham, [online] Available at: http://eprints.nottingham.ac.uk/12256/

Delgaty, L. (2013) 'A critical examination of the time and workload involved in the design and delivery of an e-module in postgraduate clinical education', *Medical Teacher*, vol. 35, no. 5, pp. e1173–e1180.

Eseryel, D. & Ganesan, R. (2001) 'Distributed group design process: lessons learned', in *Proceedings of ED-MEDIA 2001: World Conference on Educational Multimedia, Hypermedia, & Telecommunications*, eds C. Montgomerie & J. Vitelli, Norfolk, VA, USA, vol. 2001, no. 1, pp. 469–473.

Europa. (2010) 'State aid: commission processes record number of broadband projects following new broadband guidelines', [online] Available at: http://europa.eu/rapid/press ReleasesAction.do?reference=MEMO/10/31

Grunspan, D. Z., Wiggins, B. L. & Goodreau, S. M. (2014) 'Understanding classrooms through social network analysis: a primer for social network analysis in education research', *CBE-Life Sciences Education*, vol. 13, no. 2, pp. 167–178.

Gwozdek, A. E., *et al*., (2011) 'Using online program development to foster curricular change and innovation', *Journal of Dental Education*, vol. 75, no. 3, pp. 339–350.

Keating, N., *et al*., (2007) 'Factors affecting influential discussions among physicians: a social network analysis of a primary care practice', *Journal of General Internal Medicine*, vol. 22, no. 6, pp. 794–798.

Korhonen, T. & Lammintakanen, J. (2005) 'Web-based learning in professional development: experiences of Finnish nurse managers', *Journal of Nursing Management*, vol. 13, no. 6, pp. 500–507.

Lewis, J. M., Baeza, J. & Alexander, D. (2008) 'Partnerships in primary care in Australia: network structure, dynamics and sustainability', *Social Science & Medicine*, vol. 67, no. 2, pp. 280.

Lymn, J. S., Bath-Hextall, F. & Wharrad, H. J. (2008) 'Pharmacology education for nurse prescribing students–a lesson in reusable learning objects', *Biomedcentral Nursing*, vol. 7, no. 1, pp. 2.

Major, C. H. (2010) 'Do virtual professors dream of electric students? University faculty experiences with online distance education', *Teachers College Record*, vol. 112, no. 8, pp. 2154–2208.

Mancuso-Murphy, J. (2007) 'Distance education in nursing: an integrated review of online nursing students' experiences with technology-delivered instruction', *Journal of Nursing Education*, vol. 46, no. 6, pp. 252–260.

Meyen, E. L., Tangen, P. & Lian, C. H. (1999) 'Developing online instruction: partnership between instructors and technical developers', *Journal of Special Education Technology*, vol. 14, no. 1, pp. 18–31.

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630

Minnaar, A. (2013) 'Challenges for successful planning of open and distance learning (ODL): a template analysis', *The International Review of Research in Open and Distributed Learning*, vol. 14, no. 3, pp. 81–108.

Newton, R. (2003) 'Staff attitudes to the development and delivery of e-learning', *New Library World*, vol. 104, no. 10, pp. 412–425.

Penuel, W. R., *et al*., (2006) 'Investigating the potential of using social network analysis in educational evaluation', *American Journal of Evaluation*, vol. 27, no. 4, pp. 437–451.

Scott, J. (2000) *Social Network Analysis: A Handbook*. 2nd edn, Sage, Thousand Oaks, CA.

Shephard, K. (2004) 'The role of educational developers in the expansion of educational technology', *International Journal for Academic Development*, vol. 9, no. 1, pp. 67–83.

Ward, M. E., Peters, G. & Shelley, K. (2010) 'Student and faculty perceptions of the quality of online learning experiences', *The International Review of Research in Open and Distance Learning*, vol. 11, no. 3, pp. 57–77.

Wasserman, S. & Faust, K. (1994) *Social Network Analysis: Methods and Applications*, Cambridge University Press, New York.

Wharrad, H. J., *et al*., (2001) 'A comparison of CAL with a conventional method of delivery of cell biology to undergraduate nursing students using an experimental design', *Nurse Education Today*, vol. 21, no. 7, pp. 579–588.

Windle, R. & Wharrad, H. J. (2010) 'Reusable learning objects in health care education', in *Interprofessional E-Learning and Collaborative Work: Practices and Technologies*, eds A. Bromage, L. Clouder, F. Gordon & J. Thistlethewaite, IGI Global, Hershey, PA.

Windle, R., *et al*., (2011) 'The characteristics of reusable learning objects that enhance learning: a case-study in health-science education', *British Journal of Educational Technology*, vol. 42, pp. 811–823.

Appendix 1: Interview topic guides

Teaching staff interview topic guide:

1. Describe the teaching methods that you currently use
2. Describe your previous experiences of using e-learning
3. Describe your computer confidence
4. Using network drawings, describe the development process involved in the creation of the PDF documents.
   a. Your role within it
   b. Support and training
   c. How was quality assurance addressed?
   d. What level of control did you have over the process or who had the control over the process?
   e. Reporting process
5. Explore/further comments on online pedagogy

Design team interview topic guide

1. Describe your previous experiences of developing e-learning
2. Using network drawings, describe the development process involved in the creation of the PDF documents.
   a. Your role within it
   b. Support and training
   c. How was quality assurance addressed?
   d. What level of control did you have over the process or who had the control over the process?
   e. Reporting process
3. Explore/further comments on online pedagogy

Management team interview topic guide:

1. Why and how was the decision made to develop an online learning course? Explore:
   - University Strategic
   - Student learning
   - Professional Strategic
2. What were the drivers/barriers?
3. Using network drawings, describe the development process involved in the creation of the PDF documents
   - Your role within it
   - Support and training
   - How was quality assurance addressed?
   - What level of control did you have over the process or who had the control over the process?
   - Reporting process
4. Explore/further comments on online pedagogy

Citation: Research in Learning Technology 2016, **24:** 32630 - http://dx.doi.org/10.3402/rlt.v24.32630