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## The Management and Creation of Knowledge: Do Wikis Help?

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The management and creation of knowledge: do wikis help?  
Bruen, C., Fitzpatrick, N., Gormley, P., Harvey, J., McAvinia, C.

### **Abstract**

Wikis are frequently cited in Higher Education research as appropriate and powerful web spaces which provide opportunities to capture, discuss, and review individual, group, project or organisational activities. These activities, in turn, offer possibilities for knowledge development by utilising wiki collaborative active spaces.

The chapter uses selected case studies examples to illustrate the use of wikis to support online community based tasks, project development/process, collaborative materials development and various student and peer supported activities. A key focus of the chapter centres on evaluating the effectiveness (or otherwise) of wikis to create online communities to support knowledge management (development, retention and transfer). See Choy & Ng (2007), Lamb (2004), Elgort (2008), Raman et al. (2005).

By way of contextualising the studies, a variety of uses of wikis in higher education are reviewed as part of this chapter. See, for example, Lamb, (2004) Choy, & Ng, (2007), Doolan, (2006) Jones P. (2007) Raman, et al. (2005) Grierson, et al., (2004). Creation of knowledge sentence + refs?

The chapter concludes with a review of the emergent themes arising and lessons learned from the case studies. This leads into a series of recommendations relating to the effective establishment, design, management and support and use of wikis to support knowledge creation and collaborative enterprise.

**KEYWORDS:** - Wikis; Web 2.0 technologies; collaboration, communities, knowledge creation, knowledge management; teaching and learning; higher education; e-learning

### **Introduction**

Second generation web technologies including podcasting, blogs, and wikis are increasingly being used in higher education (HE) to both support and capture processes involved across a range of

different kinds of project based collaborative activities. Lamb (2004) argues that these emergent technologies are starting to fill a gap in existing practice not filled by other institutional systems, while Dede (2008) suggests that Web 2.0 technologies are redefining how, what, and with whom, we learn. But is the full potential of these new technologies being fully realised within these institutional settings? Can and are these new online spaces affording users with the opportunity to easily be able to create new knowledge as a collaborative enterprise or are these technologies just being used as cost efficient knowledge management systems?

This chapter focuses on how wikis might influence the creation and management of knowledge in HE. A wiki is defined as 'a freely expandable collection of interlinked Web pages, a hypertext system for storing and modifying information – a database where each page is easily editable by any user with a forms-capable Web Browser client' (Leuf & Cunningham, 2001). Wikis' flexibility, adaptability and potential for increased functionality via Web 2.0 plug-and-play features, has led to their adoption across a wide range of social, educational and business contexts. Wikis are easy to create, use and deploy. Wiki support and functionality is available for mainstream virtual learning environments (VLEs) such as Blackboard, WebCT and Moodle, either integrated within the VLE or provided via third-party plug-ins. Many free providers, for example PBWorks [<http://www.pbworks.com>], offer free wikis with excellent usability and functionality, including content management functionality and storage space.

This chapter will present and describe selected case studies illustrating the use of wikis to support online community based tasks, project processes, collaborative materials development, and various student and peer supported activities. The intention within each of the case studies was to use a wiki to support the collaborative creation of new knowledge as an ongoing process. Structured and unstructured online activities were combined with face to face meetings. The level of experience of using Web 2.0 technologies varied: some of the wiki designers and user groups had limited or no experience of using wikis to support community

development, but all had extensive experience of supporting online community development. Many of the users had never worked online as part of group. A key question for the authors was to evaluate the effectiveness (or otherwise) of wikis to create online communities to support knowledge management (development, retention and transfer).

The chapter concludes with a review of the emergent themes arising and lessons learned from the case studies. These focus on the affordances of the technology, the collaborative nature of the tasks and how these facilitated engagement by users and explores whether these resulted in the coconstruction of new knowledge. This leads to a series of recommendations relating to the effective establishment, design, management and support and use of wikis to support knowledge creation and collaborative enterprise.

### **Theoretical underpinnings**

In pedagogical terms, a key attraction of using wikis is that their structure is shaped from within, rather than being imposed from above by proprietary institutional systems. Therefore, users do not have to adapt their practice to the 'dictates of a system', but can allow their practice to define the structure of that system instead (Lamb, 2004). It could be argued, therefore, that wikis provide a technology which is more akin to the development of a socio-constructivist pedagogical approach in HE than traditional virtual learning environments.

Wikis as a way to support socio-constructivist pedagogical approaches Noel

The move towards more participative web technologies such as wikis has opened up a space for what is referred to as Pedagogy2.0 where the onus on content creation has been handed over to all users of the internet. There has been an explosion of the number of pages created, either in terms of blogs and wikis over the last 5 years. The creation of content on the internet is no longer the remit of a few well briefed html handlers but is now available to anyone who can navigate through the web. This shift in emphasis from *Publication* to *Participation* reflects the paradigm shift which was

much lauded in the early days of technology enhanced learning, namely that technology would enable a shift toward student centred learning. However, nearly two decades later, the affordances of such web2.0 technologies, it would appear, might enable such a move to take place. The responsibility is on the student/user to collaborate and create together. The editing and collaborative nature of wikis enables this to be done in a very public manner. The large commercial learning management systems are now all incorporating wikis as part of their functionality.

The adaptive and 'constructivist' nature of wikis make them an interesting technology to investigate, particularly as research indicates what wikis may provide the potential to adapt and support a range of teaching, learning, research and organisational activities in HE. However, the use of Web 2.0 technologies within higher education does pose questions about the nature of knowledge within academia, and how such technologies support co-construction of knowledge. Dede (2008) cites a Web 2.0 definition of "knowledge" as being a collective agreement about a description that may combine facts with other dimensions of human experience, such as opinions, values, and spiritual beliefs where traditionally, new knowledge is seen as being created through 'formal, evidence-based argumentation, using elaborate methodologies to generate findings and interpretations'.

### ***Wikis and the characteristics of community processes***

Before presenting the case studies, and any consideration of how wikis can support community processes, it is important to highlight some of the indicators demonstrated in research as denoting 'community'. According to Wenger, the concept of community is demonstrated by positive interdependence, combination of individuals to generate group responses, mutual engagement, shared understanding of 'rules and tools' (Wenger, 1997). Preece emphasizes the importance of trust, collaboration, style of communication and different stages of online community development (Preece, 2000). Goodfellow ( ) cites a sense of belonging, expected learning and obligation. Specifically in relation

to learning, Palloff & Pratt (2005) comment that '[a] community can provide the social interaction and relationships which are essential for learners to collaboratively construct social shared knowledge'

Wikis can support community-based activities in a variety of ways (Choy & Ng, 2007, Doolan 2006, Jones, 2007, Raman, Ryan, & Olfman 2005, Grierson, Nicol, & Littlejohn, 2004). Studies describe the need to create a healthy community (Shirky, 2008) and to be aware of the importance of building trust - buying into the wiki ideology is evident (Lamb, 2004). A wiki in the hands of a healthy community works. A wiki in the hands of an indifferent community fails. Elgort (2008) also identifies that student attitudes to group work, in general, are mixed, and that the use of wikis per se is not enough to improve these attitudes.

Staff and students have a range of perceptions about, and responses to, wikis as part of their teaching and learning activities, particularly as part of assessed programmes. For example, lecturers have expressed concern about a lack of control over authoring - "If anybody can edit my text, then anybody can ruin my text." A lack of hard security and privacy are also commonly cited, as is a lack of a predefined structure and organisation as users become familiarised with what is perceived as a different way of working. While wiki systems are fully transparent, user issues regarding ownership and intellectual property rights can arise if clear policy guidelines or ways of working are not pre-defined. Logical context may be gleaned by checking the list of "recent changes" on the wiki system, or by following links in and out, but first time users can experience an initial feeling of disorientation (Lamb, 2004). It is suggested that for effective use of a wiki to support learning (as in any learning design process) clear goals and learning outcomes need to be made explicit to learners in advance. Then, learning resources, supports and structured activities should be put in place and made easily accessible (Powazek, 2002).

Lamb (2004) comments that wikis function in a way that perhaps contrasts with traditional lecturer controlled approaches to online group based activities, and for wikis to fulfill their promise,

the participants need to be in control of the content—you have to give it over fully. This process involves not just adjusting the technical configuration and delivery; it involves challenging the social norms and practices of the course as well (Lamb 2004: )

Similar to the experience with other online systems in HE settings, a perception of less academic rigour is noted by some users. Meaningful learning, and the control underpinning learning processes, become the responsibility of the group rather than residing with the lecturer. Often, the full and optimal functionality of wikis is not used, perhaps as a result of a lack of familiarity of technology or way of working. Wikis might only be used as a bulletin board rather than a collaborative enterprise, if this is the established way of working. Shirky (2008) observes that the software makes no attempt to add 'process' in order to keep people from doing stupid things.

### **Case Studies: Rationale for Selection and Analysis**

A narrow sample of higher education implementations of wikis include: student individual ePortfolio development; student group case study analysis and reporting (e.g. in Medical studies for patient cases, and in Commerce studies for organisational marketing projects); as staff development training resources (e.g. as a 'Useful Resources' repository for trainers and participants, and as a collaborative space to develop participant case studies); and across virtual organisations for project management and information dissemination. The authors have each been involved in the development and implementation of wikis for teaching and learning, professional development, and project management. We have therefore selected five case studies which represent each of these areas of work. From these case studies, a number of factors influencing effective usage of wikis for higher education will be identified. We consider whether and how roles and responsibilities should be delegated. In line with other studies the importance of

nature/authenticity of task, familiarity/use of technology and wiki functions, time and support provided for use and the relevance of usage of the wiki will also be considered.

As will be seen from the Case Studies, not all community-based activities were supported through their wikis. Online activities were combined with face to face meetings. Our discussion will explore how these online communities and selected tasks have functioned. How was community evidenced? Patterns of wiki usage by the communities and the effect of various interventions will be explored - identifying features that have worked well. The case studies include commentaries relating to the way in which the communities were formed, when and how the wikis were used to support community based processes and how these were supported. We examine how the wiki activities been tailored by the originator, and then altered as the community has evolved? How have the different communities utilised/personalised the different wiki functionalities in order to further develop a sense of ownership over their online space?

### **Five Case Studies**

The case studies that follow describe the creation of online communities to support student learning, professional development, and project management. All are concerned either with knowledge management or development. The case studies are derived from different kinds of community:

1. A group of students learning in an interdisciplinary context
2. A group of staff and student representatives authoring a document collaboratively
3. A formally-convened national network for learning in HE
4. A sub-group of partners from a national e-learning project
5. A national network of e-learning practitioners, formed separately from funded projects or initiatives, and independent of any HE institution



	Case study 1	Case study 2	Case study 3	Case study 4	Case s
Clear purpose for using wiki	yes	yes			
user familiarity	Training provided?	Some not all			
user designed	Set up by lecturer?	Set up by group member			
User motivation to collaborate		Low, duplicated f2f			
Private/public spaces	public and private group space	All public			
Wiki supporting f2f meetings	yes	yes			
Moderated tasks	yes	As chapter reviews			
Finite project	yes	Review to be undertaken by specific date			
Motivation to use wiki	High – to be assessed	Low – duplicated f2f			

Table one : outline of case studies

6.

### **Case Study 1: Operations Strategy - Third-Level Interdisciplinary Collaborative Student Learning**

#### **Use Case**

The increasing need for effective collaboration among third-level interdisciplinary groups suggests the necessity of developing

teaching pedagogy that infuses teaching techniques with technologies. This case study analyses an undergraduate target module titled '0809-IE319: Operations Strategy' which has been developed by Dr. Mary Dempsey at the National University of Ireland, Galway (NUIG). The course develops students' expertise in innovation. It also seeks to provide opportunities for students to meet with colleagues from other cultures. The Operations Strategy module combines approximately forty 3<sup>rd</sup> and 4<sup>th</sup> year Business and Engineering students from Ireland (58%), EU States (29%), the United States (10%) and the Far East (3%) comprising 55% female and 45% male students. A key element of the student learning environment centres on individual, small group and whole group activities aimed at developing problem-solving approaches and strategies to resolve issues identified across a range of case study scenarios. The face-to-face teaching and learning environment was supported by the NUIG Blackboard virtual learning platform which utilised the *Learning Objects Teams LX* building block to create group wikis.

The lecturer created inter-disciplinary and multi-cultural groups at the commencement of the module. Groups were then allocated a wiki which served as a communication and collaboration space to develop group response trigger questions. During class contact time, the lecturer distributed a common case study to each group for discussion and then presented a number of trigger questions for group consideration and group resolution. Groups were asked to upload their co-constructed response via their group wiki in real-time. The lecturer called on particular groups to present their responses to particular question to trigger whole-group discussion. While wiki membership editing rights were restricted to the immediate group, all members of the module could view each other's wikis. This opened up the prospect of peer-review and evaluation exercises and allowed knowledge sharing amongst the wider cohort.

The principle wiki activities took place in the classroom setting. However, wiki access was available outside the class contact time

for further edits, additions, comments and reflections. All group members had permission to export a .zip file copy of their wiki and this could be used to demonstrate team work and collaborative working practices to external stakeholders, such as potential employers.

### ***Evaluation Methodology***

This case study was evaluated using student questionnaires, group reflective exercises, individual student video interviews and lecturer video interviews.

### ***Affordance of the Technology***

While 84% of the students had not used a wiki prior to this module, a entire student cohort found the wiki software easy (58%) or very easy (42) to use. It was easy to edit (95%) and add (87%) a new wiki page. There were some issues concerning the formatting of text that had been copied from MS Word into the wiki space. Students contributed reflective comments such as:

'I am not great at computers but it's really easy to use the wikis.' [Student 1]

'It's very very easy; very very simple.' [Student 2]

The students found that the technology was stable (90%) and were very pleased with the 24/7 access to their group wikis (96%).

### ***Collaboration***

The students explained how they used the group wikis:

We use the group wikis to tie in the class theory with practical case studies. It gets you to think outside the box. You think 'this is the real world.' [Student 3]

'We can edit together as a group in class, and then go afterwards and contribute online strategies amongst the team. We use the wikis to coordinate groups so that we can together outside the classroom. It has transformed the learning from two hours in class

to several hours outside the classroom.' [Student 4]

### ***Co-Construction of Knowledge***

The students appreciated the benefit of working in groups and clearly identified the 'real-world' relevance of replicating industry scenarios and problem-solving activities in their Operations Strategy module:

'It's about learning by doing; by interacting and getting ideas from other people. We have shared our details within the group. It's a challenge to work in a group but it's also fun. If there are conflicting issues, we can challenge them as a group and come to a consensus.' [Student 3]

'The wikis allow multiple ways to come up with a final answer and opens up new ideas. It's a great way to get group and class feedback. You learn a lot from that. It's a good challenge for future life and working in industry.' [Student 2]

While the international mix of students was clearly seen as an advantage to inform problem-solving approaches:

'We have a mix of Irish and international students. We have an American guy in our group and it's a really interesting mix. He provides a totally different view to us. It's great to learn from people with other backgrounds and perspectives to approach a problem.' [Student 7]

### ***Engagement***

Students liked working in groups and say the relevance of using their wikis to aid their activities:

You are helping your classmates. It helps to learn how to work in a group which is essential for project work. It's definitely a better way of learning because it's practical and more of a real working environment. [Student 6]

The students identified opportunities to apply their learning to wider contexts:

I did a placement with Boston Scientific and will be returning there in the summer. Wikis would be great to use with colleagues in the United States. I could see that this could work very well for collaborative projects between Galway and Boston and if you were dispersed throughout the company.

Students commented that a motivating factor in their engagement with the environment was the opportunity to take a personal copy of their wiki to showcase their achievements to external audiences, such as potential employers.

The following comment indicates student use of the group wiki to aid personal reflection on learning and knowledge gained through the learning activities:

'Because we can access the wiki permanently, and take our own copy of the wiki, I can look back see what I wrote and how I wrote it. That's when I'll really recognise the learning.'  
[Student 4]

The Course Co-ordinator felt that the use of wikis has proven successful in facilitating knowledge construction and exchange:

'The Operations Module has really engaged the students. I have had a wonderful time observing the group dynamics and evolving problem solving approaches demonstrated in the class. The wiki tool was seen as cool and novel, and very much supported the real-world element of the course. We aim to expand this module to incorporate a student cohort located in Germany for the 2009-10 academic cycle.'

## **Case Study 2: Three month review of a policy document within a**

## HEI

The General Assessment Regulations wiki was set up as a collaborative space between a group of 9 members of a panel undertaking a review over a four month period of an institutional assessment policy document. After which time, the document was to be presented to the institutional academic council for approval. The panel comprised academic staff and student representatives. Members were initially asked to consult with colleagues, review the sections under discussion and attend a series of face to face sessions to discuss during which to agree edits to the document. Any changes would be captured by the administrator and circulated via email to the group, before finally being signed off at the next meeting. A final review meeting of the full document was organised at the end of the collaborative period.

The use of a wiki was suggested during the first meeting of the group and there was agreement from all members that a wiki would provide a useful way for the group to collaborate. It was felt that it would be useful to have a live working document and all the associated materials and comments in one location, rather than collecting electronic documents via email. In addition, it was felt that individuals who were not able to attend meetings could also make comments that might then be included as part of the meeting. As the face to face meetings progressed, the panel also discussed memos, comments and feedback from members of academic council and the implications on any decisions.

The wiki was structured round the 15 sections and appendices of the policy document, with each section being allocated a separate wiki page. A copy of the existing regulations in their entirety alongside various other external, internal policy documents and relevant materials were also incorporated. An additional section that included questions pertinent to the document for example, the possible introduction of grade point average was also included. These questions had already been discussed within each faculty, but agreement regarding any changes in policy remained

outstanding.

Before the wiki was created, there was a suggestion that some time subsequently be spent going through the site at the next (second) meeting to familiarise the group with the layout. But, partly due to the difficulties in booking a room with internet access, it was decided that there was no need to take time from the meeting to do this. The only people who expressed an interest in receiving training were the panel chair and administrator. This was provided. It was also at this time, that these two individuals also expressed some concern regarding the possibility of several people editing the document and the document being openly available. Although access and editing rights were limited to within the reviewing group.

### ***Evaluation Methodology***

This case study was evaluated using a review of contributions on the wiki and a follow-up short questionnaire (5 out of the original group of 9 responded).

### ***Affordance of the Technology***

In the survey, all the panel members except one, the administrator, indicated that they had used a wiki before. Responses in the survey supported the original comments re the ease of using and navigating a Wiki.

*'It was very straightforward and user-friendly.'* [Staff B]

However, one member of staff did indicate that they felt that was a lack of familiarity by some members of the panel : *' it was a new tool for most members of the review panel. Group membership may have had mixed levels of IT competencies* [Staff D]

The administrator was the only person to express some difficulty in making use of the wiki:

*'the System in this building very slow so it was very slow to load and took a lot of time to access each area'* [Staff E]

Having never formally introduced the wiki as part of working practice of the group, there was no agreement as to how the wiki

should be used by the group.

*'I feel that many of these issues may have been ameliorated by more extensive early discussions on how the wiki would help the group to achieve its objectives' [Staff D].*

As a result, initial contributions to the wiki related to the structure of the site and how the group should work collaboratively. Questions were directed at the person who had set up the site, rather than to the members. At an early stage it became evident that use of the wiki was becoming a separate activity, rather than one supporting the review process, *'There seemed to be two parallel processes – one where you could make changes to the documents on Wiki and another where changes were made to the documents at the meetings'.* [Staff A]

A sense of ownership in determining the process was never really created:

*'there did not appear to be much "buy in" from the beginning' [Staff D]*

*Too many participants in the review weren't familiar with wiki. Again it worked out as a doubling up of work for me as even if I used wiki myself other participants weren't familiar with it so I still had to use my old format (Word).* [Staff E]

Interestingly, in week three, there were requests that other staff from two of Faculties that other staff might have access to the wiki in order to make comments. However, none of these staff ever contributed to the wiki and none of the students ever made comments.

### **Collaboration**

The potential use of the wiki as a tool for a collaborative process was recognised by most of the members:

*This tool, or something like it, holds great potential for managing review processes in general. It allows the collaborative benefits of the meeting process to extend into the days/weeks between meetings. This I feel would help the group to maintain more consistency and focus in its work.* [Staff C]



But there was a need for the wiki to have an agreed but well defined function within the group process *'Yes, potentially(useful), but only if everyone was going to use it and it was the only way you could make changes to the document or leave comments for discussion.* [Staff A]

*I also feel that the wiki should have been used as the basis for the deliberations of the group at the various meetings, therefore requiring that all meetings be held in rooms with internet access* [Staff D]

The roles of the various members within the group was also of concern to the administrator *' it wasn't my role to use the wiki' 'I had never heard of or worked with wiki as I think it is mostly academics use it.* [Staff E]

Neither minutes nor document changes were ever formally captured in the site. Some disappointment was expressed by the members:

*If it had actually been used in the way it was intended, those who used the Wiki from the start might have continued to use it.* [Staff B]

*After using the Wiki initially, I found it was just as easy to make changes to the circulated (though email) documents and then suggest the changes at the meeting. In this way, there was no need to go to the Wiki site.* [Staff A]

### ***Co-Construction of Knowledge***

Within the first week the process of making comments rather than edits appeared to become the established working practice of the group. With any final decisions being made on any changes on the policy at the face to face meetings, one individual expressed concern re making edits on the wiki

*... I was wary of using the "edit" function as I felt any change needed to be agreed before implementation.* [Staff D]

*It was pointless going to the Wiki, if it was not being used to actually make the changes to the documents.* [Staff A]

*'Interesting comments were made on the wiki but never discussed*

*at the meetings, same material already commented upon on the wiki were then covered in the meetings. [Staff A]*

The administrator also commented *'From an administrative point of view it seemed working with wiki would be a doubling up of work that I already had to complete on Word etc. [Staff E]*

### ***Engagement***

Out of the 53 comments made on the Wiki, 18 posed questions in several cases indicating a desire for comments and feedback, eg *Is this a reference to ...? Is this restriction necessary?* There were only three instances where responses were given to comment only four references to discussion to meetings or points that had been made.

One individual contributed consistently throughout the process, while 5 contributed initially but involvement gradually decreased.

*After the first few meetings I and a few others stopped making contributions because the Chair went through each chapter line by line at each meeting, irrespective of input from committee members via the Wiki, so it seemed like a duplication of effort. [Staff B]*

Lack of familiarity by some, which in turn reduced its effectiveness for others [Staff C ]

*Though I was somewhat sceptical initially when the wiki was first suggested, I am very pleased with the experience that I have gained. I will certainly be adopting this tool as part of my own work in future. [Staff D]*

### **Case Study 3: Learning Innovation Network: collaborative online curriculum design**

As part of the Learning Innovation Network (LIN) project goals, the establishment of shared academic development programmes required collaboration and sharing of a curriculum design processes. As the Learning Innovation Network comprises the

thirteen institutes of technology and the DIT it became apparent that the development of shared academic programmes would require a design and development process which would have to be innovative. Initially the sub group charged with Academic Programme Development<sup>[1]</sup> held a number of face to face meetings where the overall model for the academic programmes was discussed. A pilot programme was rolled out in a blended learning format in two of the institutes and a short course was developed and piloted in one institute. The model that was agreed by the Sub group was a 10 ECT (European Credit Transfer) Level 9 (Post Graduate) Special Purpose award which would include aspects of reflective practice and personal development planning. Once the model had been agreed work had to begin on the design and development of the seven modules. While the face to face meetings worked well for brainstorming and creating an environment where the sharing of content and processes could start it became clear that these meetings required a considerable commitment of all those involved, both in terms of travel and time.

### ***Affordance of the Technology***

### ***Collaboration***

### ***Co-Construction of Knowledge***

### ***Engagement***

The philosophy behind the development was to be one of collaboration and sharing of the design and development. Each institute would in the future be able to integrate these programmes into their own staff development programmes. In October 2008 it was decided to use a pbwiki which was password protected to facilitate the design and development process, because of the nature of the collaboration the modules would be designed collectively online. The wiki provided the creation of a space where the documents could be made available to the group before going

through the standard quality assurance process in the developing institute. A wiki would allow documents in process to be shared, commented upon, amended together and then presented for the appropriate validation process. From the screenshot below, it can be noted that the each module under development was given its own space where the individual module descriptor could be developed and commented upon. The lead institute, the institute being funded for the development and design, placed the module descriptor which they were presenting for validation in this space for comment and discussion.

There was a certain reticence about the curriculum design process and a lack of clarity was felt by certain members. After the process had begun, there was a need to have a look at the overall philosophy behind the development of the programmes and a need to refocus the development and design of the programmes. Collaborative curriculum design can be a challenging process and requires clear buy-in to the overall process. In December 2008, a face to face meeting was held and facilitated by Dr. David Baume, this session allowed the group to decide on the underpinning values that the programme development would be based on. The values were made available on the front page of the wiki.

(The Subgroup were following a process of online collaborative design which needed to be more philosophically grounded. The value system was then published on the wiki and made available as the front page.)

The wiki also provided a valuable support from an administrative point of view, as the project has a limited span and will finish at year end 2009, there was need to relay information in a centralised format to members developing and designing programmes. The structure of the wiki reflected the structure of the breakdown of the development, each folder contains the collaboratively agreed module outline and documents under discussion. While the pages were used for discussion about the document under discussion. It would be fair to say that the administrative perspective of the wiki proved to be invaluable, it enabled participants to see how the

other partners were proceeding with the document creation and to be up to date with their progress.

The use of the wiki has varied radically amongst the members/participants, some module descriptors were posted at the beginning of the process which allowed more time for amendments and comments while other members/participants used the wiki to present more 'fixed' documents where there was less room for discussion. The use of the wiki has enabled the positive inter-institutional collaboration, which has been one of the major hallmarks of the Learning Innovation Network, to be transferred into an accessible online environment. However, the limited success of the wiki does pose questions, it might be in line with a an emerging semiotics of Web 2.0 technologies (Warshauer 2007). The traditionally isolated writer is here placed at the centre of a collaborative writing activity where the final product is a representation of the success or failure of that collaboration. There is an inherent tension in the process which was undertaken on the LIN wiki, a tension between authorship, ownership and collaboration. A wiki enables open visible collaboration in the writing of documents, which edits by whom are clearly visible. The demarcation between author and audience becomes blurred where the audience participates also in the authorship. The tension in our case arose between the open-ended nature of the collaboration afforded by the wiki and the ownership over curriculum design processes which tend to be institutionally led.

#### **Case Study 4: NDLR Evaluation, 2008**

##### ***Background***

The National Digital Learning Repository (NDLR) provides a shared online resource bank of teaching materials for HE institutions in the Republic of Ireland. It is currently in transition to becoming a full service, following a pilot phase, which was evaluated in 2008. Three phases of evaluation were undertaken: one focusing on users' responses, one on the technical aspects of the project, and one on the subject networks established under the auspices of the project.

The NDLR includes all Universities and Institutes of Technology, and therefore the three phases of work were carried out across all partner institutions by a team representative of all partner institutions. Working to tight deliverables and deadlines, the team needed close collaboration, but had limited capacity to meet face-to-face.

### ***Affordance of the technology***

Email initially served adequately for the evaluation group in the drafting of evaluation plans. Face-to-face meetings of the NDLR Board also took place, which are a core function of the project's management and have been convened quarterly since its inception. However, outside these meetings the evaluators were working at disparate sites. Email became difficult in terms of version control for project documents. Partners who had joined the group but who had not previously been involved in the NDLR had limited or no access to legacy data-gathering instruments and draft materials from the early stages of the pilot. The team had no means of collectively editing text without repeated rounds of email correspondence.

To facilitate our work, we initially used a Google Groups space as a means to share documents. However, some members of the team reported difficulties accessing the Google Groups and/or non-receipt of email from the Groups area owing to the network settings for their work computers. More importantly, with increasing need to write together, a wiki appeared to afford much greater functionality to support the work of the group.

### ***Collaboration and engagement***

We decided to use a wiki to support the evaluation project, and set up the 'Evaluation' wiki on [www.pbwiki.com](http://www.pbwiki.com) (now PBWorks). This was a password-protected space which would be secure to the project team in the first instance.

The wiki was set up to reflect the three separate strands of

evaluative work, and it provided a safe space to share data and documentation. Reports and 'fixed' documents (such as agreed plans and deadlines) could be stored for ongoing reference, with commentary pages describing their status, or updating on progress towards particular deliverables. Legacy documents were included to support newer members of the team, and to provide easy reference points for the current evaluation. Versions of different documents were visible within the wiki's content management structure. We could see clearly when changes and additions had been made, and the wiki included an alert feature which emailed partners to advise when changes had been made by someone in the team. Therefore, the wiki functioned in the first instance as a valuable administrative support to the evaluation work. As such, everyone had 'buy-in', as it became our principal workspace, and facilitated collaboration on both small and large tasks associated with the evaluation.

### ***Co-construction of knowledge***

The wiki came to play a more important role when we moved towards analysis of the data collectively across the three strands of work. What might otherwise have been an unwieldy and messy process was instead clear and simple. However, it is important to mention that a face-to-face meeting instigated the work that we were then able to continue in the wiki. At the mid-point of the evaluation, with data from surveys, interviews and repository logs gathered, we met to begin our analysis. Paper and pen brainstorming identified some of the emerging outcomes. The wiki then allowed us to transfer the broad themes and findings to an online space, and to continue brainstorming for some weeks afterwards. We could also indicate where relevant data was coming from to support our findings, and even hyperlink to that data or relevant documentation if it was already stored in the wiki. Each member of the team could revise and refine the broad findings, and annotate them with information about where data would support each one. This process provided the backbone for our reporting, giving us a thematic structure which could be addressed in each of three reports for the project.

While we have not undertaken a separate analysis of our use of the wiki, it is reasonable to suggest that its successful use stemmed from a number of factors. We were highly motivated to use it in order to complete a range of detailed tasks within a tight timescale.

We were a small team of people who already knew each other. We were all fairly confident users of the technology, even though we might not have used wikis extensively before. We needed a shared space to function as an archive for previous work and completed work, which was essential for reference but which had been clogging email Inboxes. The wiki afforded a useful administrative support, but also a vital means of collaborative authoring as our analysis took shape. While the work could have been completed without the wiki, it would likely have taken longer, or our data analysis could potentially have suffered without adequate appropriate spaces to compare our findings.

## **Case Study 5: Irish Learning Technology Association - Project Management**

### ***Background***

The Irish Learning Technology Association (ILTA) is a voluntary community of Irish professionals committed to the development and exchange of knowledge by sharing expertise and the promotion of best practice in technology-enhanced learning across all sectors in Ireland. In 2008/2009, a number of innovative activities were rolled out to mark the tenth anniversary of the association and to refine a new future strategic direction enabling a move towards a more formalised structure and formation of the association as a professional body. The association's steering committee grew from a core group of seven individuals to nine sub working groups consisting of approximately 44 individuals across 15 organisations. The central activities of the association, and the key annual milestone – EdTech annual conference - was extended in scope and objective. To facilitate the centralised progression of this project



work at a pivotal milestone in the association's lifecycle, a wiki was set up as a collaborative space where the new extended steering committee could progress the central aims and deliverables of the association.

At the inaugural meeting of the new committee (in which the majority of members had vast experience in the use of web 2.0 tools to moderate online communities), the decision was taken to replace the existing CMS and Google groups area with a single wiki [<http://iltaworkinggroup.pbwiki.com/>]. The majority of committee members had used some form of wiki technology previously and all agreed that typical features of wiki functionally would best lend itself to the project management needs of the working group. The most important of these were sharing and storage of ongoing private documentation; in-context commentary describing status and version; instant visibility of task status, schedule and key documents; virtual coordination and collaboration on tasks outside of regular face to face contact and meetings; reducing the number of emails and overlap of tasks between sub groups; supporting any handover activities; and knowledge creation and exchange. [2]

The wiki was structured to reflect the strands of work across the nine working groups (Education, Events, External links, Finance, Information, Publication, Research, Web development and Conference organisation). Each sub group had its own folder and home page to enable them to plan and collaborate on their activities.

### ***Affordance of the Technology***

The wiki technology was found to be easy to use and navigate. It provided a safe secure space to share data, survey feedback from the membership, and documentation from face to face meetings. Configuring the customised security settings did not require any IT supports but was authorised by the sub group administrator. The project files were stored online, eliminating the need to send and

store electronic versions to all stakeholders. This reduction in email traffic served as a significant productivity booster. The wiki software recorded a full audit of all changes, making it easy for all to see who had made modifications to shared resources. The wiki also integrated seamlessly with other platforms (e.g. existing forum, CMS and website) and necessitated little investment in hardware, software, installation or training.

### ***Collaboration, Co-Construction of Knowledge & Engagement***

The wiki structure made it possible to aggregate a wide range of organisational knowledge from the diverse group, enabling partners to work across tasks. Though project specific pages were set up for each group to disseminate focused and timely information so that priority tasks could be completed rapidly. The wiki allowed for increased transparency so individuals were able to work faster on their focused tasks while being able to engage with the full range of sub groups involved. This meant that much of the editing, review and rewrite processes were reduced. The wiki also succeeded in creating its own momentum. Aided and abetted by the association chairs, the wiki became a dynamic knowledge base for the association. The wiki continued to expand to include minutes and agenda of meetings, contact details and roles for those working on the project as well as scheduling functionality for online and face to face meetings.

## **Discussion**

Our five case studies, drawn from the broad range of contexts in which people in HE are working, show these online communities functioned, and how they undertook their tasks. In this section we address common themes, but also points of difference, between each case.

### ***Decisions to use the wikis:***

*All case studies had selected to use a Wiki, rather than an institutional virtual learning environment or other facility, both as an easy to use collaborative space and as an alternative to email*

*correspondence.*

For students in CS1, the wiki offered a more authentic learning environment, and one that they would be likely to use again in the business world after graduation. In the other case studies, wikis offered the means to transcend institutional systems and boundaries, overcoming administrative issues (such as account creation and login distribution).

*All case studies reflect a need to complete key tasks within deadlines, and used wikis to facilitate these tasks.*

Case studies 2-5 reflect the need for a disparate group to work together within constrained time periods. The wikis were used in different ways, often simultaneously supporting tasks at the administrative level, while also functioning as the medium through which tasks were undertaken.

***Affordance of the technology:***

*All case studies reported that users found the wikis easy to use and navigate. Most users were already comfortable in using technology although not necessarily familiar with use of wikis.* The structure was initially defined by an individual or prior experience of using a Wiki. Most structures were defined by the principal reason for using the wiki. In CS4, the NDLR team had a pre-existing workpackage. In CS3, LIN had a remit to develop its various programmes. In CS2, the document sections determined the structure of the wiki, and in CS1, group case studies provided the framework for the online writing.

*Wikis provided the flexibility to support a range of different structures*

In CS4 and CS2, work arose from collaborative strands, and ongoing activities 'offline', in particular the creation and review of documents and reports. In CS3 and CS4, the wiki site structures evolved as the collaborative activities evolved, and enabling the editing of documents.

*Most groups reported administrative value of a wiki.* In CS4, the wiki alerted members to changes, which was important for their work. A

shared space is useful not only for current work, but also for the storage and archiving of previous work. Managing large numbers of documents would have been unwieldy for a number of the projects discussed, had they not used the wiki for this purpose.

### ***Engagement and collaboration***

*The openness of the wiki could be problematic unless a clearly defined structure and managed way of working is established.* CS2 highlights that the lack of an introduction to using the wiki may have influenced the ways in which it was used. –CS3 discusses the tensions that can arise between ownership of curriculum design, and the open-ended nature of collaboration in the wiki. In CS1, individual or group management of tasks was felt to be important in determining the quality and relevance of group output.

*There is need to have early buy-in and commitment to make use of the Wiki by the groups at an early stage.* All of our case studies illustrate the need for perceived relevance and usefulness of wiki by all or a critical mass of its users. In all cases, the wiki was incorporated as part of the group's activities, and group processes were structured around the wiki. CS1 and CS3 in particular show a focus on group activities within different working spaces of the wiki. Where this didn't happen, there appeared to be a perceived lack of clarity related to the roles, editing rights and relevance of using the wiki (CS2, CS3).

*Wikis were selected to support online activities between face to face meetings of the groups and worked most effectively when used in this way.* In CS1, the student group incorporated use of the wiki as part of face-to-face meetings. But the cases demonstrate that it was important for the use of wiki to be integrated into the other activities of the groups. CS3 and CS4 show that the wiki allowed people to continue activities started in the face-to-face context or conclude them prior to meetings. In CS4, the wiki was also a vital means of collaborative authoring as the data analysis took shape.

*Flexibility of wikis enabled groups to work together in different*

ways. Early working practice appeared to become established working practice for a number of groups (CS1, CS2). The students in CS1 worked together on structured face to face case studies in groups and then contributed online, comparing and contrasting other student work. In CS2, the GAR group noted that the wiki was used more as a bulletin board rather than collaborative space although users posted comments posing open ended questions seeking some kind of response.

*Wikis also enabled changes in working practice as the communities evolved.* In CS4, the evaluation authors revised and refined their broad findings, and annotated them with information about where data would support each one. They also 'inducted' newcomers to the team with the support of the wiki, uploading legacy information for these members to access. In CS3, module descriptors were posted at the beginning of the process which allowed more time for amendments and comments, while other participants used the wiki to present 'fixed' documents for which there was less room for discussion.

### ***Co-Construction of Knowledge***

*The need for a shared safe space was felt to be important by all groups. Editing rights were of concern to all groups.* GARS members in CS2 felt that editing decisions should be made face to face and then uploaded. Editing rights were limited to group members within the CS1 group spaces: groups were asked to upload their co-constructed responses via their group wiki in real-time. All groups could see other wikis but not edit the work. CS3 discusses the need for clear guidelines regarding editing rights in the wiki, and draws out the tension between sharing authorship and 'owning' curriculum development.

### ***Wikis as reflections of community***

To what extent do these case studies present wikis as reflections of the communities using them? They appear to show the importance of interdependence, evidence of group responses to issues, joint efforts to address issues of concern to each group, and mutual engagement in the task to hand (Wenger, 1997). However, we

suggest that understanding of the wiki as a ‘tool’, but also the potentially challenging ‘rules’ of that tool, is something still evolving (Wenger, 1997). A tension emerges in some cases between trust, and open authorship/editorship, and this may be linked to the stage of the community’s development (Preece). Obligation and motivation were important factors in driving the communities, and the wikis provided engines for their work. However, our findings would appear to support those of Shirky (2008) and Lamb (2004), who suggest the need for a healthy community in order to make effective use of a wiki, and to get ‘buy-in’ to the wiki as a medium.

Table 2: Summary of case study outcomes under chapter themes??

	Case study 1	Case study 2	Case study 3	Case study 4	Case s
affordance	✓	✓	✓	✓	✓
collaboration	✓	✓	✓	✓	✓
coconstruction	✓	X	X	✓	X
engagement	✓	✓	✓	✓	✓

## Conclusions

### ***Do wikis afford knowledge creation? And if so, how?***

The basic [idea] of the Web is that [of] an information space through which people can communicate, but communicate in a special way: communicating by sharing their knowledge in a pool. Berners-Lee (1999) foresaw the web as a place where ideas would be produced, as well as discovered.

Our findings suggest that wikis can function as both supports to, and engines of, community activity. The affordances of wikis support communities in their development, although that development is dependent in part on other factors. If well-functioning communities generate knowledge, then we can suggest that these case studies lend some evidence to the view that wikis afford knowledge creation. Moreover, wikis support knowledge management in complex collaborative projects, which are

increasingly a feature of the Irish HE landscape. Varying success in terms of knowledge creation has been reported however Choy & Ng (2007), Lamb (2004), Elgort (2008), Raman et al. (2005). Researchers report that wikis are often used more to provide information, manage and update existing knowledge, but of limited use to collaboratively create new knowledge.

### ***Future directions***

The case studies and discussion presented in this chapter point the way to a number of areas for further research. We are interested in examining in more detail the relationship between well-formed 'offline' communities, and how quickly and effectively they begin to use wikis. The point at which the wiki stops being primarily a support for collaboration, and instead becomes the means for new knowledge to be produced, is a further question for more detailed investigation. Additionally, we ask whether institutions which seek to engage in collaborative projects to an increasing extent, can offer institutional systems to compete with those already 'out there'. If not, are there implications for the management and storage of sensitive information? Or for the creation of new knowledge which may have commercial or other advantage for a particular institution? New ways of exploiting the affordances of wikis may also emerge, and we will continue to examine how these affordances interact with the communities of which we are members.

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