

# **Analysis of the use of Wiki-based collaborations in enhancing student learning**

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Business School staff are active in research in numerous areas, including complexity theory, institutional economics, economic modelling, efficiency measurement the creative industries, employment studies, finance, accounting, statistical methods and management science.

The University of Hertfordshire has been recognised as the exemplar of a business-facing university. It is one of the region's largest employers with over 2,700 staff and a turnover of £205 m.

In the 2008 UK Research Assessment Exercise it was given the highest rank for research quality among the post-1992 universities.

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## **Introduction**

"Wiki" is an extension of a standard web-site that allows anyone to add new and edit existing content. The most famous example of the wiki usage is the "wikipedia" - the increasingly popular on-line encyclopaedia ([www.wikipedia.com](http://www.wikipedia.com)). Any malicious or accidental updates are safe-guarded against by an inherit version control system.

Since their introduction in mid 90s ("WikiWikiWeb" developed by Ward Cunningham) wikis have been used as a tool to assist businesses (Leuf&Cunningham, 2001; Cortese, 2003; Goodnoe, 2005) as well as e-learning environments in schools and higher education (Leuf&Cunningham, 2001; Bruns & Humphreys, 2005; Richardson 2006), by providing new and simple ways for a web-based collaboration and authoring.

The main aim of this paper is to identify and assess the ways in which wiki technology can enhance students learning experience in a blended-learning environment. In the analysis we will focus on learning and teaching issues raised in the scenarios developed during the Semester B trial in the UH Business School, with a target group of 20 MSc students studying "E-business interactions" module. The module wiki is still available and can be accessed by UH account holders at:

[http://logos.herts.ac.uk/wiki\\_bs/index.php/Main\\_Page](http://logos.herts.ac.uk/wiki_bs/index.php/Main_Page)

The rest of the paper is organized as follows:

"Wiki environment" provides a summary of the wiki technology and existing wiki environments and description and analysis of the selected environment for use with the target group.

"Learning Theories" contains an overview of the main learning theories that support wiki-based e-learning

"Scenarios" provides analysis of the main teaching and learning scenarios (i.e. use-cases) employed, in the context of supporting learning theories as well as tutor's and students' experience

"Guidelines" contains guidelines for other lecturers interested in using wikis within their subject area, based on the Semester B trial.

Sections "Conclusions", "Glossary" and "References" are self-explanatory.

Appendix A contains the student questionnaire responses.

Appendix B contains description and analysis of the module assessment criteria and results.

Appendix C contains screenshots of some of the module wiki pages referenced in the text.

## **Wiki environment**

In this section a summary of the wiki technology is provided and wiki environments currently used for e-learning, as well as criteria for selecting the chosen environment (“MediaWiki”) and evaluation of its usability are considered.

Ebersbach et al (2005) summarise the main characteristics of wiki technology as a web-based software that allows anyone to edit the content of the page in a browser i.e. “on the fly” and that allows quick and easy change of the content (therefore the name “wiki” from Hawaiian word for “quick”).

In order to add the wiki functionality to an arbitrary web-server, a “wiki engine” must be installed on the server. Wiki engine is a simple program (“script”) together with a database for storing multiple versions of wiki pages. Wiki pages are written in a simple language, much less complicated than the standard HTML language for web page creation. The language itself is not standardized, but because of its simplicity it is easy to move from one variant to another.

The three main functions supported by every wiki engine are page access, edit and history. When a client tries to access a wiki page (by clicking on the page link), the browser send a request to the server and the server script retrieves the page from the database, translates it into the HTML format and sends the file back to the client to be displayed in its browser. When a client requests an edit of the wiki page (by clicking on the “edit” button) the server retrieves the “raw” wiki page from the database and send it back to the client for display. Once the editing is completed, the client might choose to save the content of the page (by clicking on the “save” button), which results in the server storing the new content in the wiki database. When the same page is accessed again the new content will be displayed. The page history function allows a display of the version history of the page and selection of an arbitrary version for display. This function provides necessary safeguarding against any malicious edits or deletions.

Ebersbach et al (2005) distinguish between four different roles for participants involved in accessing, editing and maintaining wikis: reader, author, wiki administrator and web administrator. Web administrator is responsible for installation and maintenance of wiki engine and the container web server. Wiki administrator maintains wiki content and is provided by additional functions (“interface”) for administrating pages (e.g. page deletion), users of the wiki site and their access rights. The scope and variety of the functions available to the administrator varies amongst different implementations of wiki engines. The readers’s and authors’s roles are self-explanatory: a reader reads and an author edits a wiki page. They are provided with a same interface, so that these two roles can be combined.

Wikipedia (2006a) contains an up-to date list and feature comparison of currently available wiki engines. They are classified according to the following criteria: infrastructure requirements (e.g. server platform, database etc), support for attachments and images, user administration, page access control, spam prevention, in-line HTML, user-customizable interface, WYSIWYG page editing, web feeds, extensibility, performance (measured in time to load a page), ease of use, ease of installation, cost and licensing requirements.

In the Business School trial the MediaWiki engine was employed, since it provides support for most of the listed features, it is free and it has been used by the wikipedia project, so students' familiarity with its interface was likely and assumed. However, the questionnaire results showed that less than half of the students (46%) have heard of the wiki and wikipedia and only 31% have used the wikipedia before.

Another option was to use one of the commercially (or freely) available "wiki farms" e.g. JotSpot. These are the specialized web-sites, that provide not only the wiki functionality but also the server space for storing the pages, i.e. wiki-hosting (see Wikipedia, (2006b)) for a comparison list of the currently available wiki farms). The majority of the wiki farms are feature-rich and relatively cheap (even free for limited usage). The main benefit of using a farm, instead of an engine on a proprietary server would be to allow access to the users outside of the UH Intranet i.e. to everyone on the web and to "outsource" the maintenance function to an external provider. This option was considered but not used in the trial. The main reason was the wish to learn more about wiki's internal implementation and provide the students with a familiar web-page interface.

MediaWiki engine was installed on the UH Intranet server and students were allowed access from the campus as well as remote access from home (via the UH proxy). External moderators were supplied with a guest UH account, that allowed them to access the module wiki immediately after the Semester B i.e. during the moderation period.

The tutor, who acted as the only wiki administrator, used the following additional functions during the trial: blocking of users (used once for a student who was not registered on the module); deletion and movement of pages; "recent changes" function – for monitoring the weekly contributions by individual students; history function; user usage statistics (for assessment purposes).

The main strengths of the MediaWiki software are its ease of use (77% of students have found it easy to use and easy to learn to use the module wiki); its similarity in look and feel with any ordinary web-site and easiness of (wiki) administration. Its main weaknesses are relatively complicated installation procedure, the lack of embedded access right functions, including prevention of anonymous access (those features are available, but require separate installation).

## **Learning theories**

In this section, includes a literature overview of the main learning theories that are relevant to the wiki model for e-learning.

Similarly to weblogs, wikis are “truly constructivists tool for learning” with wikipedia being “a poster child for the collaborative construction of knowledge” (Richardson, 2006). Nevertheless, the summary starts with the description of the complementary – behaviourist approach to learning and explain how wikis can be used in a more traditional learning environment.

### *Behaviourism*

Behaviourism is a traditional well-established theory of learning, founded through the work of I. Pavlov and B.F Skinner. The theory defines learning as a result of “operant conditioning” i.e. behaviour changes. While in Pavlov’s case the “conditioning” is not voluntary (“Pavlov’s conditioning”), Skinner’s theory assume voluntary change in the behaviour. The learning process is further guided through positive (and less so negative) “reinforcement”. The learning thus progresses in small pre-determined steps, where each step builds-up on the previous learning and it can be measured in observable changes in behaviour. Furthermore, Skinner emphasizes the role of “teaching machines” (a predecessor of contemporary computer-based learning environment) in a positive reinforcement: “the machine, like private tutor, reinforces the student for every correct response, using the immediate feedback to ...hold the student’s interest” (Skinner, 1968).

Behaviourism is the predominant learning theory used by practitioners in contemporary educational institutions and as a consequence all well-known commercially available VLEs (e.g. WebCT and Blackboard) as well as the proprietary VLEs known to the author (UH StudyNet) were initially designed based on the behaviourist approach (Amori, 2005). Wikis as a “teaching machine” can emulate everything that a traditional e-learning platform provides i.e. content management, user management and communication features. For example, lecture resources (such as notes, references, coursework tasks etc) can be incrementally stored (and revealed) on a wiki server (“step-by-step learning”); wiki pages can be designed to provide computer-based formative assessment (“reinforcement”) and tutor can provide immediate feedback on the same wiki site.

### *Constructivism*

Constructivism is based on the idea that learning is a self-directed process in which the learner builds the new knowledge based on the existing knowledge and experience. Constructivism has many different variations, such as: Vygotsky’s social development theory, Piaget’s genetic epistemology, Kolb’s experiential learning theory, problem-based learning, facilitation theory etc. Regardless of the variation the main principles are the same, that is – a learner is responsible for own knowledge construction; learning occurs when “the learner uncovers a deficiency in their knowledge or an inconsistency between their current knowledge representation and their experience” (Dalgarno, 2002).

This gap between the actual and potential development level is also known as “zone of proximal development” defined by Vygotsky (1978).

Clearly, wikis provide platform for knowledge construction, via concurrently accessible and modifiable content.

### *Socio-constructivism*

Socio-constructivism’s main contribution to the general model of constructivist learning is the hypothesis that knowledge construction is a social process that occurs through collaboration with others (e.g. tutor, peers etc). Therefore knowledge becomes shaped through a social process, where “ideas are presented as a starting not ending point for discussion” (Siemens, 2005). Vygotsky (1978) defines the “potential development level” as the one “determined through problem solving under adult<sup>1</sup> guidance or in collaboration with more capable peers”. Furthermore he states that the development processes can “operate only when the child<sup>1</sup> is interacting with people in his environment and in cooperation with his peers”. The peers together with tutor provide “scaffolding” to help the learner achieve its potential development level.

Wikis are defined as a tool for collaborative authoring and web-content construction. Therefore the role of collaboration is emphasised in all studies of use of wikis in education. (See for example <http://westwood.wikispaces.com/>).

### *Problem-based learning (PBL)*

Problem-based learning is best described using Boud’s definition (Boud, 1991): ‘the principal idea behind PBL is, that the starting point for learning should be a problem, a query or a puzzle that the learner wishes to solve’.

PBL is a student-centred learning approach, where the student (‘learner’) takes responsibility for their own learning through full participation in all stages of the PBL cycle. That includes: brainstorming, problem identification, identification of learning needs, refinement of ideas, application of new knowledge and continuous reflection. The teacher in PBL becomes a ‘facilitator’ responsible for setting the ‘trigger’ for learning and guiding ‘learner’s problem-solving through all stages of the PBL process.

The definition of a ‘trigger’ is very important for successful PBL outcomes. A ‘trigger’ is ideally an ‘ill-structured’ problem that in addition has the following characteristics: activates and incorporates previous knowledge, promotes discussion and collaboration, promotes critical thinking, requires new knowledge and meets the objective of the module or session (Biggs, 2004).

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<sup>1</sup> Vygotsky’s work on “zone of proximal development” has initially been defined in the context of child development.

The main benefit of the PBL is encouragement and fostering of ‘deep-learning’. Deep learners, as opposed to ‘surface’ learners, go ‘below the surface of the text to interpret that meaning, using the deep approach’ (Biggs, 2004).

In order to ease some of the issues related to the ‘pure’ approach, a ‘hybrid’ PBL approach is usually a good starting point in implementing the ‘pure’ PBL model.

‘Hybrid’ PBL can be implemented in variety of forms, but essentially, it means that the self-study is accompanied by some degree of traditional style lectures. Those could be ‘framework’ lectures given at the start (PAD3 Lecture Notes, 2005), or short lectures following or preceding self-study periods.

Wikis can be easily set to enable the PBL approach – the tutor’s role is to set up the initial “trigger” and let students complete the tasks and “solve the puzzle”.

### *Theory of Experiential Learning*

Kolb’s theory of experiential learning (Kolb, 1984) is based on Piaget’s constructivist approach as well as Lewin’s experiential learning model (also know as “Kolb’s learning cycle” – see figure below). The model defines the learning process in stages, starting from acquiring “concrete experience”, analysing that experience and data gathered through “reflective observation”, formulating theory (“abstract conceptualization”) based on the previous data and finally applying the concepts in new situations (“active experimentation”). Learning is further defined as a continuous process of knowledge construction “grounded in concrete experience” and through “transactions between the person and its environment” (Kolb, 1984).

**Figure 1 Kolb's learning cycle (taken from Brooks, 1995)**



Kolb also uses the four stage learning model as a basis for distinguishing between different learning styles (based on learner’s emphasis on each of the four stages of the learning process). Those styles correspond exactly to the ones defined by Honey and Mumford (1992): activist (emphasis on concrete experience), reflector (emphasis on

observations and reflections), theorist (emphasis on abstract conceptualization and generalization) and pragmatist (emphasis on active experimentation).

Richardson (2006) calls wikis a “democratic tool” because of its inherent support for different learning styles. Based on Kolb’s analysis of characteristics of different learning environments (Kolb, 1984), and how they can help or hinder different learning styles, wikis can be seen as a tool that helps activists, reflectors and pragmatist and less so theorists.

### *Conversational Learning*

Laurillard’s conversational model of learning (Laurillard, 2002) starts with the teacher setting up the task and then engaging in a continuous discussion with the student that helps in guiding the student towards the solution. Richardson (2006) further extends this model to include other participants and defines learning as “a continuous conversation amongst many participants”. In a wiki-based learning environment those other participants can include the whole world inside and outside the classroom i.e. inside and outside the institution firewalls.

Wiki is an obvious candidate tool to support the conversational model of learning. But more importantly, a learning strategy is required to support the learning dialogue. Russell (2006) provides an initial exploration of the use of “just-in-time teaching” (JITT) strategy in the context of conversation model of learning. In the JITT model, the teacher gathers “the students’ conceptions just-in-time to help re-shape or guide the up-coming lecture”.

### *Collaborative Learning*

Collaborative (or group-based) learning is steadily gaining in popularity, not only, as sometimes assumed, because it implies lighter marking load for the tutors, but more importantly, because of the non-cognitive skills that are acquired in the process and that are vital for employability of students, such as teamwork, team leadership, time and project management in a group context. There is an abundance of research in this area and in particular on the role of the VLEs in collaborative learning. Kearsley and Shneiderman’s (1999) “engagement theory” focuses on collaborative learning through the work on meaningful and ambitious projects and provides a framework for technology-based collaborative learning. Doolan and Barker (2004) evaluate the use of UH proprietary VLE (StudyNet) in supporting collaborative learning and working; Alavi’s study (Alavi,1994) findings indicate that technology-based group work results in better skill development and self-reported learning than the work in a traditional classroom. These are just some results from a growing base of knowledge in this field.

Wiki provide a natural VLE for collaborative work. However, more important are the issues related to group work such as: establishment of the group “ground rules”, assessment of group work and group formation strategies.

### *Facilitation theory*

Laird’s theory (1985) emphasise the role of the teacher as a facilitator and responsibility of students’ for their own learning. He further suggest that the facilitator needs to concentrate on the relation with learners as much as on the content of teaching and be ready to receive and accept constructive feedback

Related to this is the role of the tutor in the wiki environment for learning and the questions on how much “scaffolding”, corrective actions and feedback should a tutor provide.

According to Richardson, (2006) use of collaborative technologies such as wikis and blogs, creates a shift in the role of teachers to not only facilitators but to collaborators and “change agents”.

### **Scenarios**

In this section we will describe scenarios that were employed during the 2005/6 Semester B trial in the context of Business School MSc module on E-business interactions. With each scenario we will aim to provide analysis in the context of applicable learning theories, as well as students’ and teacher’s experience. At the end of the section we provide a summary of the SWOT analysis on wiki usage (see Table 1).

The participants in all of the described scenario are students and tutors registered on the module wiki (including internal and external moderators).

#### *Start-up*

This scenarios starts with the tutor creating the main wiki page (see Appendix C), and student accounts. After that, the tutor introduces the main concepts of the wiki during the lecture time (first module lecture) and invites students (via automatic e-mail) to activate the wiki accounts and start using the module wiki. The first task is to write a personal page with details relative to the subject of study and module aims and objectives.

The majority of students responded by adding some content to their personal page. Only 10% of student had problems and did not know what was required of them and 10% have provided the content that was relevant to the module subject.

With regards to learning theories, this initial scenario was supported by hybrid PBL approach – students were given a “trigger” in the form of a task introduced on the main wiki page, but also necessary supporting information for the task completion during the lecture time.

### *Collaboration*

Students’ on-line collaborations were realised through creation and maintenance of on-line “learning objects”, where by learning object we assume “any standalone unit of learning material” (Bennett, 2006). The following learning objects were created in the trial: on-line glossary, bibliography and the subject FAQ. For each of the objects, similar scenario was employed: tutor creates initial set of wiki pages (i.e. templates) for each of the learning objects and students contribute regularly by adding content to the growing knowledge base (also known as “structured bulletin board”, Leuf & Cunningham (2001)).

For example of initial page templates (“scaffolding”) see Figure 5 in Appendix C.

There were 34 entries in total in the Glossary, 40 entries in the Bibliography and 10 entries in the FAQ list. The Glossary entries were of varying quality, but have helped the students to get common understanding of the terminology used in the module (69% of students agreed that building a wiki based glossary has helped in their learning of the subject). After the initial framework was set, none of the pages were updated by the tutor, therefore enabling 100% ownership by the students. Although many Glossary entries have been repeatedly modified, in the majority of cases they were modified by the same person, giving the impression that students have established ownership on particular Glossary items and did not attempt to “step to each others feet”. In that sense the collaboration was limited to collaborative creation of the glossary, but not individual glossary items.

Collaborative creation of learning objects has direct theoretical roots in socio-constructivist learning theory and other theories of collaborative learning, as well as facilitation theory (students responsible for own learning, and the role of tutor being changed to that of an observer and facilitator). Creation of glossary items can mapped into the “abstract conceptualization” stage of the Kolb’s learning cycle (see Figure 2).

### *Communication*

The aim of the discussion scenario was to provide a session-specific on-line discussion forum, where students and tutors can clarify and further develop topics and ideas discussed in-class.

In this scenario, tutor would set a topic for discussion (see for example Figure 6 in Appendix C) and students would add their opinions, analysis and in some cases all that synthesised with the previous knowledge and experience.

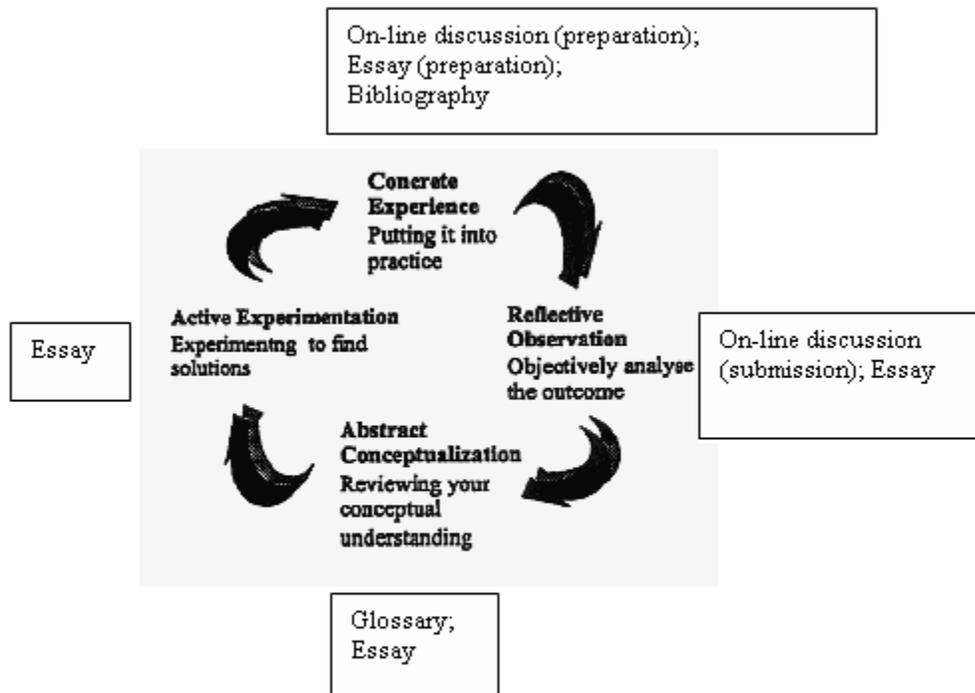
Similarly as before, after the initial task was set, the tutor's role has been the one of observer, rather than active participant in the discussion.

Clearly, wikis provide more fine-grain capabilities for discussion than traditional "threaded discussion forums. For example, instead of "replying" to an entire message, the participant in a discussion can create a hyperlink to a new wiki page on any word from the original page. Discussions are easier to follow since the content is available via hyperlinked wiki page, rather than a series of reply messages on a traditional threaded discussion forum. However, except in few cases, students were not using this capability, possibly because of their familiarity with the traditional linear discussion style and a lack of guidance on how to make the content more "link-rich". Students' responses to the on-line discussions were ranging from non-objective opinions, to fully referenced, objective, critical assessment of the topic. For more detailed data on the quality of students' responses see Appendix B. 69% of students agreed that on-line discussions have helped their learning and 54% of students agreed that the topics were interesting and appropriate.

The on-line discussions, as implemented in the trial, are partially supported by the Laurillard's "conversational learning" approach and Kolb's experimentation learning theory. In order for this scenario to be fully supported by Laurillard's model, the role of the tutor should be extended to that of an active participant in the discussion. Research that student have done for the topic of discussion, including the bibliography that they have consulted in their research would correspond to the first stage of the Kolb's learning cycle ("concrete experience"), while the submitted contributions could be seen as fulfilling the next stage of "reflective observation" (see Figure 2).

### *Feedback*

The importance of feedback in a learning process is one of the fundamental postulates of constructivist learning theories that define knowledge construction as a social process that occurs through collaboration with others. Skinner also recognizes the importance of immediate feedback and risk associated with the lack of it, that may result in time wasted in un-learning the incorrect responses (Skinner, 1968).



**Figure 2 Application of Kolb's learning cycle**

Current practices in higher education that are largely assessment-oriented need to be re-adjusted to focus on continuous feedback rather than once-and-final “verdict” (i.e. final grade) in order to respond to students’ needs and enhance their learning experience.

Supporting student collaborations and encouraging them to seek peer-feedback, is essential for their employability and seamless integration into a modern working environment that is teamwork-oriented and customer-centred.

In the “on-line review” case, students were asked to upload drafts of their essays on the wiki, modify and extend them as well as provide feedback to their peers. Tutors have provided feedback to students on the work in progress. In that way, the work of students and the feedback they receive on the wiki was completely transparent.

Despite initial “shyness”, almost all of the students (85%) have eventually submitted their essays on the wiki; and only 38% of students were not comfortable in making their work visible to other students...

The tutor provided the initial trigger for all student essays (see example in Figure 7 in Appendix C) and continued the dialogue with the student whenever substantial change was made. 62% of students have agreed that tutor reviews of their essays have helped them in improving the overall quality of the essay.

Peer-to-peer reviews have been done outside but also inside the classroom. The latter proved to lead to more substantial contributions. Surprisingly few students agreed that peer reviews were helpful (38%). This is an interesting finding that requires more experimentation and analysis that is outside of the scope of this paper.

This scenario is fully based in the socio-constructivist theories, especially theory of “conversational learning”, problem-based learning and engagement theory and it maps into all phases of the Kolb’s learning cycle (see Figure 2).

*Other scenarios*

The rest of the scenarios used in the trial were mainly information pages, such as coursework information and discussion page (students were told that all coursework enquires would be answered on the wiki, rather than through the individual e-mails and private discussions); help pages on how to use and build wiki, students’ personal pages and similar.

*SWOT Analysis*

The SWOT analysis summary shown in Table 1 is relative to the use of wiki technology in the specific trial and does not extend to the general wiki “SWOTs”. Also, it does not include general VLE “SWOTs” such as: instant 24/7 access to information, less paper work etc. but only wiki-specific ones.

The SWOT items are listed in no particular order.

The opportunities summarised in the SWOT table indicate some areas of potential future work (therefore no section on future work).

**Table 1 SWOT Analysis on wiki usage (L= Learner, T = Teacher)**

SWOT items		L	T
<b>Strengths</b>	Provides variety of experiences (discussions, glossary, peer reviews etc)	✓	
	Provides single point of contact for all students queries (.e.g. coursework information pages)	✓	✓
	Facilitate greater communication amongst students (on-line discussions, peer-to-peer reviews)	✓	
	Supports asynchronous (non-instant) communication mode (enables responses of higher quality)	✓	✓

	Facilitate acquisition of transferable and non-cognitive skills; prepares students to be not only readers and writers, but also editors, reviewers and collaborators; Facilitate development of research, organizational, and negotiating skills (Richardson, 2006)	✓	✓
	High reliability and performance	✓	✓
	Ease of use and ease of rules (“Wiki Etiquette”)	✓	✓
	Openness of the media and wider audience results in better quality of writing and less (none in the trial) attempts to plagiarise. Students more careful regarding plagiarism, grammar and language.	✓	
	Help student employability by preparing them for teamwork, global audience and peer reviews and in general for the new business model where “collaboration is the expectation rather than exception” (Richardson, 2006)	✓	
	Provides searchable and navigable structure for reflection, meta products, analysis, history of development (Richardson, 2006). Enables creation of hypertext with non-linear navigation of the content (Ebersbach et al, 2005) ;	✓	✓
	Facilitate “connective writing” (Richardson, 2006) with emphasis on criticality, clarity, structure, linkage etc; Facilitate “transactional writing” (Glogowski K. quoted in Richardson, 2006) – writing based on comments and feedback (e.g. trigger, write, feedback, reflect cycle)	✓	✓
	Support for different learning styles (“inherently democratic medium” ((Leuf & Cunningham, 2001)	✓	
<b>Weaknesses</b>	Asynchronicity (not sure when to expect the response)	✓	✓
	Better for certain learning styles than others (“digital natives” vs. “digital immigrants”, Prensky, 2001 )	✓	✓
	Portability issues because of non-standardized language		✓
	Does not include spelling checker	✓	✓
	Lack of interests (53% of students made un-sufficient number of contributions and 54% of students responded that they wouldn’t be contributing to the wiki if it was not linked to the assessment) Some possible reasons for lack of interest: insecurities (group consisted of 60% international students from various countries) and unfamiliarity with the concept of collaborative learning and value of the feedback.		✓
<b>Opportunities</b>	Increased feedback and communication	✓	✓
	Increased emphasis on collaborative learning	✓	✓
	Opening wiki to external contributors’ i.e. “expanding the walls of the classroom” (Richardson, 2006)	✓	✓
	Assign ownership of the space/topics to students (Richardson, 2006; Leuf & Cunningham, 2001)	✓	✓

	Incorporate “social bookmarking”(Richardson, 2006)	✓	✓
	New assessment strategies: Add entries to wikipedia, build module wikipedia, add or edit entries in on-line wikibooks (Richardson 2006)		✓
	Potential for “playful creation” (Esenbach et al(2005)); Only 46% students responded that working with wiki was fun (possibly due to lack of images and the connection to the assessment)	✓	✓
<b>Threats</b>	Inappropriate comments and how to deal with it	✓	✓
	<i>Who owns the text?</i> (Esenbach et al(2005)) Whose work is being assessed? Pye (2006))		✓
	Unrealistic expectations (e.g. instant response, frequent review of draft assignments)		✓
	Extra (unpaid) workload for module management		✓
	Copyright and intellectual property issues	✓	✓
	Technology should help, not hinder not hinder the module aims and objectives (Russell, 2006)	✓	✓

## Guidelines

In this section, we will provide guidelines for teachers interested in employing wikis in their curriculum. The guidelines are listed in no particular order.

### *Provide sufficient “scaffolding”*

Many reports on wiki usage have concluded that the less scaffolding the better quality of the created content (Richardson, 2006). However, we believe that some guidance on the content is essential i.e. it is important for the wiki not to be empty at the start but to provide certain content that can further be extended (Esenbach et al(2005)). The amount of scaffolding also depends on the student study level (e.g. master or undergraduates), composition of the group (“digital natives” vs. “digital immigrants”, as defined in (Prensky, 2001) ) etc.

### *Separate article page from talk page*

Article pages should be used for collaborative content creation, while talk pages should be reserved for discussions.

### *Provide cross-links between existing VLE (e.g, UH StudyNet) and wiki*

This is easy to achieve and useful for quick movement between the two.

### *Provide early access to module wiki to all “stakeholders”*

External moderators and possibly textbook authors could provide valuable contributions to the wiki and students would benefit greatly from their involvement (“many, many teachers” Richardson, 2006). If the wiki engine/farm is within the UH Intranet boundaries, a temporary “guest” account can be created for external clients.

*Provide students with examples of “objective language”*

Students need guidelines for objectivity and credibility (“neutral point of view”), which is important pre-condition for collaborative editing: “striving towards objectivity is a form of self-education” (Esenbach et al, 2005)

*Reserve time for introduction to wiki at the first session*

Despite the ease of use, the use of wiki still need to be learned (Esenbach et al, 2005) as well as its “rules of conduct” (e.g. wikietiquette).

*The threat of malicious use is over-estimated*

The impact of “vandalism” is overestimated and easy to revert due to the versioning control system that is in place (Pink, 2005; IBM, 2003).

*Invest time to evaluate candidate wiki engines/or farms*

Choice of wiki engine/farm should be evaluated according to the needs of the project and participants

*Incorporate wiki in the assessment*

According to the questionnaire, more than half of the group would not use wiki if it was not linked to the assessment, and yet around 70% of students have agreed that use of the wiki has helped them in learning. This implies that a wiki should be built into the assessment. Richardson (2006) proposes an assessment schema that starts with different levels of on-line competences: from the simplest posting of links to the complex reflective and referenced postings that continuously build on the previous knowledge and experience. Marking schema used in the module trial is outlined in Appendix B.

*Use wiki not only from outside, but also inside the classroom*

This is a nice activity in a classroom (Doolan, 2006) and it reserves time for students who lack motivation to concentrate on the wiki work.

*Provide guidelines rather than rules*

Wiki philosophy requires “flat hierarchies” (Esenbach et al (2005)) and as such the teacher’s role shifts towards collaborator and facilitator for learning rather than authority and ruler.

*Use web-feeds*

Most wikis provide web-feeds in the form of a listing of “recent changes”. This is a very useful feature for the tutor and easy to enable in the browser (e.g. through a tab in the

Firefox) so that most recent wiki updates can be listed quickly without explicitly going to the module wiki site.

## Conclusions

The following areas of core knowledge and values (defined by the Institute for Learning and Teaching and quoted in CELT, 2004) need to be considered when using wikis in a blended learning environment:

- subject material (the described approach is suitable for any subject area, but possibly more applicable to “discursive”, rather than “exact” subjects);
- methods for teaching and learning (wikis foster “learner-centric” approach);
- level of study (applicable to any level, but with different amount of “scaffolding”);
- models of how students learn (support for different learning styles);
- respect for individual learners and their development;
- a commitment to the development of learning communities.

The idea of a “democratic (communication) medium” is not new - Tim Berners-Lee original idea was for a web to be a collaborative medium “a place where we can all meet and read and write” (T.B.Lee quoted in Richardson, 2006), rather than unidirectional information channel. Even before Lee, the famous German writer Bertold Brecht dreamt of the extended radio system that would be “capable of not only broadcasting but also receiving, of thus being able to make a listener not only listen but also speak, and not to isolate him but to connect him” (Brecht, quoted in Ebersbach et al (2005)).

It is an accepted fact that Wiki technology *is* a true enabler of that “read/write” web. The application of the wiki and its potentials in higher education are still under investigation and are currently being studied and evaluated in many universities around the world.

## Glossary

<b>FAQ</b>	Frequently Asked Questions
<b>HTML</b>	Hyper Text Markup Language
<b>ILT</b>	Institute for Learning and Teaching
<b>JITT</b>	Just In Time Teaching
<b>PBL</b>	Problem-Based Learning
<b>RSS</b>	Really Simple Syndication
<b>UH</b>	University of Hertfordshire
<b>VLE</b>	Virtual Learning Environment
<b>WYSIWYG</b>	What You See Is What You Get

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## Appendix a - Questionnaire

	Agree	Disagree
1. Login procedure was easy and always worked	77%	23%
2. The URL ( <a href="http://logos.herts.ac.uk/wiki_bs">http://logos.herts.ac.uk/wiki_bs</a> ) was easy to remember	46%	54%
3. I had no problems accessing the wiki pages	77%	23%
4. I had no problems saving (i.e. submitting) my work	92%	8%
5. The time to load the pages was good	92%	8%
6. Wiki technology was easy to use	77%	23%
7. Wiki technology was easy to learn	77%	23%
8. The structure/layout of the wiki pages set by tutor was clear and simple	85%	15%
9. To use wiki the user must be computer literate	62%	38%
10. I usually used the wiki on campus	62%	38%
11. I have used the wiki technology before	31%	69%
12. I have heard of the wiki technology before	46%	54%
13. The instructions provided by tutor for using wiki were appropriate	69%	31%
14. The support provided by tutor in using wiki was appropriate	69%	31%
15. Wiki supported me in preparing the coursework	54%	46%
16. Using wiki has helped in my learning of the subject	69%	31%
17. On-line discussion topics for were interesting and appropriate	54%	46%
18. Participation in on-line discussions has helped my learning	69%	31%
19. Building wiki based glossary has helped my learning	69%	31%
20. Reading & reviewing other students essays has helped my learning	69%	31%
21. I have submitted my essay on the wiki for review	85%	15%
22. Tutor reviews of my essay have helped me in improving the overall quality of the essay	62%	38%
23. Other students reviews of my essay have helped me in improving the overall quality of the essay	38%	62%
24. I was comfortable in making my essay visible to other students	62%	38%
25. Feedback provided by tutor and other students was fair and useful	62%	38%
26. I would have used the wiki even if not directly linked to assessment	46%	54%
27. I would recommend the use of the wiki in other Business School modules	54%	46%
28. I would recommend the use of wiki for this module in the next academic year	69%	31%
29. Wiki is a worthwhile supplement to StudyNet	77%	23%
30. Using wiki was fun	46%	54%

## Appendix B – Assessment results

Assessment strategy was 100% coursework based, where the coursework consisted of three components: practical (non-wiki based) group work (30%), wiki-based essay (50%) and other wiki contributions (20%).

While the first two components were assessed using the generic UHBS Postgraduate Grading Criteria, the criteria used for wiki contributions were the quantity and quality of contributions. The quantity was measured as a percentage of contributions relative to the required 32 postings (corresponding to 10 weekly tasks); furthermore each posting was weighted in the following way: on-line discussion (3), essay reviews and feedback (3), glossary (2), bibliography (2) and miscellaneous (1). The criteria used for “quality “ of contributions were: objectivity, critical assessment, use of theory, evidence of reading outside of the recommended literature, quality of writing etc The quality coefficient applied was in the range 1.2, 1.1, 1.0, 0.9, 0.8 – corresponding broadly to grades A-E.

	<b>Non-wiki based coursework</b>	<b>Wiki-based Essay</b>	<b>Other wiki contributions</b>	<b>Final</b>
<b>A</b>	18%	<b>12%</b>	29%	12%
<b>B</b>	71%	<b>53%</b>	6%	41%
<b>C</b>	18%	35%	18%	41%
<b>FX</b>	0%	0%	0%	0%
<b>F1</b>	0%	6%	<b>53%</b>	12%

Percentage of students who were awarded extra marks because of the quality of their wiki contributions (i.e. with coefficient greater than 1.0): 30%

Percentage of students who contributed regularly, but whose contributions were assessed to be of “lower quality” (i.e. with coefficient less than 1.0): 10%

Percentage of students who attempted to plagiarise: 0%

## Appendix C – Wiki screenshots

Figure 3 First version of the module wiki main page

image.

navigation

- [Main Page](#)
- [Community portal](#)
- [Current events](#)
- [Recent changes](#)
- [Random page](#)
- [Help](#)
- [Donations](#)

search

toolbox

- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Printable version](#)

## Welcome to the E-business System Interactions Wiki

This wiki will be used to support the following features of the module:

- [On-line discussions](#)
- [Groupwork](#)
- [Weekly tasks](#)

In addition to that I have created stubs for:

- [Students](#) pages
- [Help](#)  pages.

Please start by [login](#)  in with your username and password and then continue editing your own page under [Students](#) (see [help documentation on wiki editor](#) ) - provide some information on your background, objectives and anything else you would like the rest of the group to know! Also, remember to check the [Weekly tasks](#) at least once a week (and definitely before the Thursday lecture)

If you discover anything new that the rest of the group can re-use - add it to the [Help](#)  page

Please remember, information added to the wiki can be viewed and changed by ANYONE on the UH Intranet. Use wiki as you would use any other UH resource: responsibly and with positive intentions (read wikipedia pages on [Wiki Etiquette](#) ).

**Disclaimer:** Wiki is not a replacement for StudyNet. StudyNet will continue to be used in the following areas of the module curriculum delivery: News, Module Information, Teaching Resources and Assessment Details.

Enjoy wiki-ing!

--[Mcubic](#) 12:15, 1 March 2006 (GMT)

Figure 4 Final version of the module wiki main page

path to your own logo image.

navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help
- Donations

search

Go Search

toolbox

- What links here
- Related changes
- Special pages
- Printable version

## Welcome to the E-business System Interactions Wiki [edit]

This wiki will be used to support the following features of the module:

- Individual contributions to [On-line discussions](#)
- Signing-up for [Essay topics](#) and [Groupwork](#)
- Publishing [Weekly tasks](#).

In addition to that I have created "stubs" for:

- [Students pages](#)
- [Help](#) [page](#)
- [Bibliography page](#)
- [Glossary page](#)
- [HTML/Dreamweaver FAQ page](#)
- [Coursework information page](#).

Please start by [login](#) [in](#) with your username and password and then continue editing your own page under [Students](#) (see [help documentation on wiki editor](#) [page](#)) - provide some information on your background, objectives and anything else you would like the rest of the group to know!

Remember to check the [Weekly tasks](#) at least once a week (and definitely before the Thursday lecture!). For the purpose of part#4 of your assessment (on-line discussions) you should aim each week to contribute to at least one discussion topic, add at least one definition to the glossary and add at least one reference to the bibliography (of the article you have read).

If you discover anything new that the rest of the group can re-use - add it to the [Help](#) [page](#)

Please remember, information added to the wiki can be viewed and changed by ANYONE on the UH Intranet. Use wiki as you would use any other UH resource: responsibly and with positive intentions (read wikipedia pages on [Wiki Etiquette](#) [page](#)).

**Disclaimer:** Wiki is not a replacement for [StudyNet](#) [page](#). [StudyNet](#) [page](#) will continue to be used in the following areas of the module curriculum delivery: News, Module Information, Teaching Resources and Assessment Details.

**Important:** Please do not edit this page.

Enjoy wiki-ing!  
--Mcubric--

Figure 5 Initial Glossary page

Set \$wgLogo to the URL path to your own logo image.

navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help
- Donations

search

Go Search

toolbox

- What links here
- Related changes

article discussion edit history Create an account or log in

## Glossary

This is the students-built glossary on E-business terminology. Please add your entry (in alphabetical order) or fill-in existing place-holder

**Contents** [\[hide\]](#)

- 1 B2B
- 2 B2C
- 3 DNS
- 4 E-business
- 5 E-commerce
- 6 FTP
- 7 HTML
- 8 HTTP
- 9 Internet
- 10 IP address
- 11 ISP
- 12 Proxy
- 13 URL
- 14 WWW

Figure 6 On-line discussion topic

Set \$wgLogo to the URL path to your own logo image.

article discussion edit history

## E-CRM project failures

Gartner & Butler group reports (quoted in Mello (2001)) claim that 60-70% of all CRM projects fail. Discuss possible reasons for such a high failure rate. Has the situation improved since early 2000? Justify your answers with references.

Create an account or log in

Figure 7 Initial Essay Talk Page

Set \$wgLogo to the URL path to your own logo image.

article discussion edit + history

## Talk:Internet Payment Systems

Start by reading the section on Secure Electronic Transactions and Alternative payment systems from the textbook. Establish what is the current "state-of-the-art" re: electronic payment systems (use SET as an example) and what are the emerging trends (e.g. PayPal for B2C transactions and emerging standards for B2B transactions). In looking at the current patterns, you can identify one of the common payment methods (e.g. credit card payment over Internet) and try to "pattern-ize" it by answering the following questions:

- what is the problem the "pattern" is trying to solve?
- what are the main business (and IT - if relevant) driver for using the pattern
- outline solution (in terms of main participant, supporting applications and the interactions between all of those)
- provide examples of use (e.g. credit card payment used on all major e-commerce sites).

Mcubric

navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page

Create an account or log in