The quality and trust of wiki content in a learning community

Trevor Peacock, Geoff Fellows and Ken Eustace
School of Computing & Mathematics
Charles Sturt University

User generated content is having an ever-increasing influence and presence on the Internet. Wiki communities, in particular Wikipedia, have gained wide spread attention and criticism. This research explores criticisms and strengths of wiki communities, and methods to reconcile the two. This research tests wiki software in an educational setting to determine indicators of article quality. The results give insight into the use of wiki systems in educational settings, suggest possible methods of improving the validity of content created within wiki communities, and provide groundwork for further research in the area.

Keywords: attention analysis, content rating, learning community, quality, trust, wiki communities

Introduction

The Internet has seen the astonishing growth of blogging, RSS, and podcasting, as forms of user-generated content. Blogs are replacing traditional news sites, and online discussion and interaction, through the popularity of sites such as Digg and Slashdot are changing the way we find, judge and trust information. Wikis have continued this trend in user-built interactive information universes. Wikipedia, a free, open-content encyclopaedia has popularised the concept of a wiki, with many projects adopting MediaWiki, the software used by Wikimedia for Wikipedia, or creating their own custom wiki systems.

Leuf and Cunningham (2001), p. 14 (cited in Schwall 2003) define a wiki from a technological standpoint 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.

From a conceptual view the Wikipedia Contributors (2006a) describe a wiki as:

> a type of website that allows users to easily add, remove, or otherwise edit and change most available content, sometimes without the need for registration. This ease of interaction and operation makes a wiki an effective tool for collaborative authoring.

Wikis are gaining widespread use in business, in an open online format, and in education. This research sought to understand the problems with the reliability and trustworthiness of content in wikis, and how these problems can be solved.

Problems with wikis

Wikis break the traditional model of publishing (Graham, "What business can learn from open source"???). Rather than authors publishing in their own spaces, and competing for an audience, authors contribute to the same space, attempting to improve the collective writing of the community. In this paradigm people contribute what they like, the good stuff stays, the bad gets removed (Graham, same as above???). This is the major criticism of wikis in general, that quality cannot "evolve" from this process. The perceived problem causing this criticism is no guarantee of the accuracy of content, and there is no formal process of validation, to prove that the content is correct. Rather, a continual process is used, where content is constantly being validated and edited, and accuracy is transitory.

This and other problems with wikis, can be demonstrated by the criticisms of Wikipedia. Wikipedia's primary criticism extends from its promotion as an encyclopaedia. The 'open' Wikipedia community cannot guarantee the same reliability as the established and traditional 'closed' encyclopaedias, as there are no limits on who may edit content, and the lack of a formal peer review process. The freedom of 'editability' is one of Wikipedia's greatest advantages, and has been the factor that has allowed Wikipedia to grow at such a phenomenal speed.

In contrast, Nupedia (Sanger, 2002) employed a strict editorial process of peer review that ultimately brought development to a crawl, where Wikipedia abandoned such limitations completely. This open editing is one of the philosophies of the community, allowing people to contribute anonymously, and refine/fix other contributors' work.

Building an encyclopaedia is an admirable and inspiring goal that drives contributors, leading to Wikipedia's success today.

> Wiki pages represent consensus because it's much easier to delete flames and spam than indulge them. What remains is naturally meaningful.
> (http://c2.com/cgi/wiki?WhyWikiWorks cited in Leuf & Cunningham 2001 and Schwall 2003)

Critics say that allowing any fool to edit the encyclopaedia is a great detriment to the encyclopaedia, allowing poor quality content to enter into the encyclopaedia. The community however disagrees; poor work is removed or repaired by the community.

> ... the articles that are now part of Wikipedia have been created by a general public under the general guidance of some very smart, articulate people. In other words, article quality is determined by standards enforced by the best and brightest of a particular community--not by the worst, most transient elements of that community.
> (Sanger 2002)

Key research question

In the broader context of the use of ICT in higher education many authors have called for a focus on the educational value of the activity (Mason, 2003; Laurillard. 2002; Goodyear, 1998). Goodyear (1998) in particular stressed that:

> we should try to design technology which is appropriate to their actual work rather than technology which embodies our teacher/managers' beliefs about what students should be doing.

Consideration of the literature in conjunction with the problems ands criticisms of the use of wikis in an educational setting led to this key question with regard to the educational value of the actual work. This was to be carried out through design of a ratings systems framework, which would allow students to take responsibility for the quality of the wiki content :

Are there any methods by which a wiki community can provide some level of authority over content?

Methodology and experimental design

The peer review method, where an article is validated by a group of experts in the topic area, is a trusted model. It is however an expensive process. One proposed method of making this process easier is to pre-identify good articles, and eliminate poorer articles, before beginning the validation process. This research tested two simple techniques to achieve this. Investigation of the selected techniques aimed to answer the following sub-questions:

1. Can user ratings made be reliably used to identify quality articles?
2. Can attention data be used in a wiki environment to estimate the quality of an article?

To answer all these questions, this research used a range of subjective, objective, qualitative and quantitative research methodologies to process different types of data, and to triangulate results from these different sources to provide a clearer picture (Preece 2000). Considering the little research done in the field, this research looks at a wiki in a naturalistic setting, focusing on aspects of quality arising from a real-world wiki community.

The community studied was formed from an undergraduate class during Spring 2006 at Charles Sturt University, which studied the social and technical aspects of computer-supported collaborative work and online communities (Charles Sturt University 2006). The subject uses a practical approach where students learn to collaborate using various collaborative tools. This group of participants allowed observations to be made of their participation in an authentic learning setting as the effectiveness of wikis was investigated.

The researchers implemented a wiki {called KakapoWiki – after an endangered New Zealand flightless parrot}, and designed a rating system, to be used by editors of the wiki to collaboratively rate each others work. To be able to collect server logs and enhance the wiki with a a ratings system, meant that the researchers used an open source wiki. The server logs, included records of every action made by the student users of the wiki. This allowed participant behaviour to be analysed. At the end of the log data collection period, a questionnaire was conducted. Questionnaire results aided in interpreting results from the server logs, and helped to answer any remaining questions.

MediaWiki 1.7.1 was the version implemented (the most up to date stable version at the time of installation), it was configured for public access, and seeded with a set of pages explaining the purpose of the wiki, instructions for editing the wiki, and the set of assignment tasks to be completed by the students. The wiki was extended with a simple page rating mechanism. The rating mechanism allowed users to rate an article within the wiki, using a standard 5-star rating.

The seed pages provided communal areas for communication and finding information relevant to the students' tasks. Certain key pages were omitted, with the intention that students should create these create based on the instructions provided the researchers. Example pages were also added, as a guide to students when writing their own pages. Over the course of the experiment, the wiki was monitored, and kept tidy by the researchers who filled the "janitorial" role, following the guidelines set out by the Wikipedia Contributors (2006b).

Students in the class were placed into groups of three or four students. Each group had a fortnight to complete four collaborative exercises (Eustace 2006; Eustace & Hay 2000) dealing with an investigation of online multiplayer games and their communities. These exercises were designed with three goals in mind:

• Provide a suitable exercise for learning and assessment
• Generate valuable content for the wiki
• Promote typical wiki behaviour

This group work using a wiki was assessed in week12 of a 13-week course as well as providing data for the research.

A wiki does not generally have a set of tasks that each user completes, rather there may be a to-do list that volunteers may complete. For the participants of this research however, it was required that there be a compulsory element to the activities to ensure participation, and to facilitate the academic assessment of the students work.

The group exercises attempted to set, where possible, few limitations regarding the type of interaction within the wiki. This was to try to accurately simulate a wiki community, where there are generally no such limitations. Students were required to contribute 500 words for each of the two activities, however the distribution of these 500 words was not limited. The words could be "spent" adding to existing articles, or pooled with a group of people to generate a larger article.

Students were also encouraged to rate other articles they read, and to be creative, to let ideas flow, encouraging students to search, rate, contribute to, and learn from each others content. These activities were designed to encourage an organic site (Leuf & Cunningham, 2001), so the students may not have been used to studying this way.

Once all data were collected, articles were analysed to determine an objective measure of quality. These measurements provided a baseline measure of the quality of articles, for comparison with system-generated ratings.

After work in the wiki had been completed, a follow-up questionnaire was given. The participants were asked to answer a questionnaire, comprising of questions arising from observations and results from the wiki experiment phase. This data was used to aid in the interpretation of the results from the server logs, and was aimed to determine users' perceptions, opinions, feelings and motives regarding their participation in the wiki.

The sequence of steps (sometimes iteratively by nature) followed in this research was:

1. Wiki software written
2. Wiki implemented

3. Tasks written
4. Students invited to start exercises on selecting and testing an online multiplayer game & community
5. Server logs collected and filtered
6. Rating data filtered, analysed
7. Manual ratings generated (detail how manual ratings were generated, and compared with collected data)
8. Attention data analysed
9. Questionnaire completed
10. Questionnaire results analysed

In summary, five data sources were:

- article content, which was the content created by users of the wiki, including any textual content, discussions, comments, and historic revisions of articles;
- ratings, as determined by users of the wiki through the embedded rating system;
- server logs, allowing user behaviours to be monitored, to see how users interact with the system, and to determine time spent using the system, including attention data;
- questionnaire results, general demographics, users' computer self-efficacy, and user thoughts on the use of the wiki and rating system; and
- observations by the community and the researchers.

Results and findings

Student contributions to the wiki were made in fairly regular intervals. It was observed that most students would post an entire article with a single edit. It seemed that students preferred to draft their writing in an off-line system (perhaps a word processor). There were however a few exceptions, where students may post a paragraph at a time. There was little modification to text however, after its original submission.

The exception to this contribution style was the Group pages. These were pages where students were specifically asked to use for collaboration between members.

> ... create an article for your POD group. Have each member add a short description of themselves, including your full name, a link to your user page, and whether you are a distance or internal student. Use this page to communicate with the world what your group is doing. (Exercise 1)

These pages were not created when seeding the wiki, they were left for students to create. Most of the editing of these pages was observed, usually by several members of the group. These pages were frequently updated with often minor presentation changes, following each others lead, and fixing each others mistakes. It seemed these pages were perceived as common property. However in cases where a single student posted their writing on a page of its own, other students would not venture to interfere.

Server logs

The wiki was installed and initialised on the Internet Special Projects Group (ISPG) server in early July 2006. The Internet Special Projects Group's server, maintained by Geoff Fellows, hosts several applications for research projects, as well as teaching resources. Over the following weeks, the wiki was seeded with its initial set of pages. Data recovered from the server contained 15 162 lines of logs pertaining to KakapoWiki, recorded between 31/Jul/2006 and 20/Sep/2006. From this number were removed requests for files (3234) (not to the MediaWiki engine itself), including CSS files and JavaScript files requested through the engine (2119 and 762 respectively). 2436 lines generated from automated (non-human) requests to the wiki were also ignored. 5 lines also failed to be matched by the regular expression being used to parse log file records. None of these five pertained to the wiki. In total 6606 usable entries were retrieved from the Server logs (non-automated queries to the engine). These logs provide a rich source of objective measurements of behaviour, however they do not reveal intent or the thoughts and feelings behind the behaviour.

In total 81 ratings were made by users of the wiki during the recording period, Some of the 81 recorded ratings were filtered from the results to improve reliability. The ratings disregarded were (i) where the user rated a page a second time (ie, corrected, or re-assessed a page), (ii) where the user rated a page they themselves had recently edited. Table 1 summarises ratings based on two determining factors.

Table 1: Summary of ratings usefulness

Ratings	Possibly Biased	Unbiased	total
Final Ratings	32	31	63
Corrections	12	6	18
total	44	37	81

In total, 31 usable ratings were generated. Comparing ratings with page views gives an idea of users willingness to rate articles. A user will rate 2.2-2.9% of pages they view, generating 0.84-1.1% usable ratings per page view.

Distribution of raw and filtered ratings were uneven. Raw data showing 78% of ratings occurring in the top 40% of the one to five scale, while filtered results showed 87% of ratings in the same 40%.
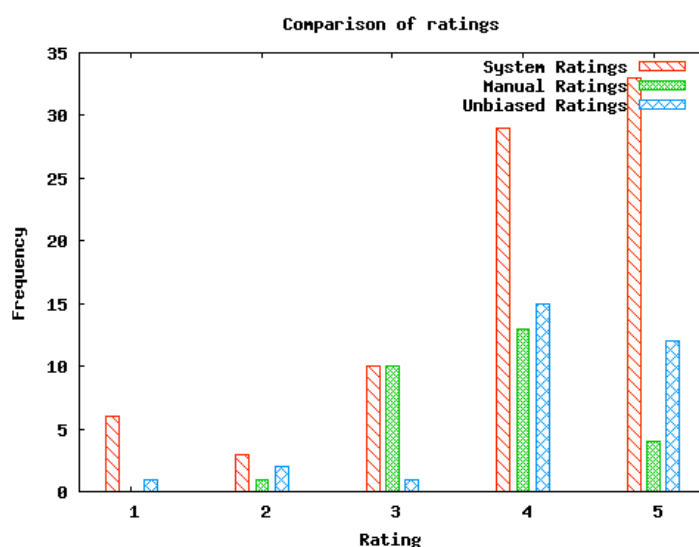

Figure 1: A tally of the number system ratings, unbiased ratings, and manual ratings for each value

A regular occurrence of positive ratings is found also to be true in eBay ratings, where members are very positive towards trading partners. Resnick and Zeckhauser (2002) suggests this is in keeping with social norms to treat others well. Dellarocas (2001) however puts it down to a "culture of praise", where members feel that the correct thing to do is to be kind and forgiving to other members. In doing so, users may also avoid rating bad pages.

Rated pages were manually assessed by the researcher to gain a baseline quality measurement (summarised in Figure 1). Pages were judged on the potential usefulness of the information on a page (to an internal or external viewer), and the information content of the page. The scale used was a 1-5 rating. A better rating could be sought, either by building a more strict marking scheme, or consulting an expert in the field of instructional gaming, however the ratings generated are believed to be a suitable starting point for analysis.

The manual ratings (Figure 1) showed a more even distribution than the system generated ratings, with the mode slightly lower than the system generated ratings, and a minimum score of 2. These scores were compared with the system-generated ratings to see how effectively the rating system performed in the wiki. No significant correlation was found between system ratings and manual ratings.

Attention data analysis

This study also analysed attention data. Attention data gives a measure of the amount of attention (measured in time) spent on a task (rating) or object (page). Attention data was collected from the Server logs and processed by a script that identified individually a users' actions, and by processing them chronologically, identified the amount of time between actions. Analysis was made of time spent viewing pages, time spent rating pages, and a count of page views. This data was compared against system ratings and manual ratings. No significant correlation was found in this trial.

Questionnaire

Two major findings in the logs were the low number of ratings, and the fact that a large number of ratings were identified as having a potential for bias. The questionnaire sought to understand the students' level of participation in the wiki, and what factors influenced it. It sought to understand how students viewed the rating system, how they used it, and possible biases. The questionnaire was conducted online and contained 57 questions, consisting of 51 numeric ratio entry questions, 1 short answer and 5 extended response boxes.

Thirteen students were asked to participate in the wiki and eleven completed the questionnaire. The 85% response rate is due to strong encouragement from the lecturer of the subject, as the questionnaire participation was an assessable task. Since the results of the questionnaire were designed to provide guidance in interpreting the log results, the low sample size of eleven, given the population size of thirteen, was not seen as a problem.

The ages of participants ranged from 20 to 32, with 20 the mode, an average of 24.4, and a median of 22. Participants were eight male and three female, with a roughly equal split of internal and distance education students, 55% internal, 45% external. Every respondent was completing an information technology or information science based degree. These results were expected for an information technology focused subject.

The questionnaire sought to understand participants' confidence and ability with computing tasks. Students were asked to report their confidence in performing a number of tasks. Allowable responses followed a standard five-point Likert scale.

Computer self-efficacy results showed, as expected, a highly confident group of participants. Wiki self-efficacy questions showed that students learned all basic wiki skills required of them. A small number were not confident in more advanced topics, such as uploading files, and discussion signing, however all students possessed the minimum required skills.

Participants were asked about their previous experience and exposure to wikis. No respondent agreed that they knew what a wiki was before participating in this research, however three of the participants reported they were unsure. When asked if they had contributed to a wiki before, three were uncertain, while the remainder were confident that they had not. Realising that many people do not understand that there is a collaborative model behind Wikipedia, participants were also asked if they had ever used Wikipedia. Most (9) participants were unsure, while the remainder reported they had not.

When participants were asked if they had rated any articles, only six report they had done so. As reported above, some members may be hesitant to rate items in a small community and where benefits of rating are unclear. Rashid et al. (2006) found that the number of ratings contributed can be increased by illustrating certain benefits to the user. When asked if they understood how to use the rating system most responded positively, three were unsure, and only three were highly confident. Those who did not rate on average were slightly more confident in understanding the rating system than those who did rate.

The questionnaire attempted to identify if there may have been any bias in ratings. When asked to honestly assess the accuracy of their ratings, participants were largely uncertain of the accuracy of their ratings. One respondent felt their ratings were not accurate, while only four showed any confidence in their own ratings. There was less confidence among participants of other users' ratings. eight of respondents displayed neither agreement or disagreement with the statement that other peoples ratings were accurate.

The exercises completed in the subject were intended to allow students to get to know each other, to work together, and generate friendship between peers. It was therefore pertinent to ask if participants felt they were likely to rate their friends' articles more favourably. A range of responses was received, from strong agreement (2), to strong disagreement (1). Overall two disagreed with the statement, while five expressed agreement.

Overall users of the wiki found ratings to be only slightly useful, one respondent found the system not useful, while five found it only slightly useful.

The questionnaire asked students what factors they felt were important when rating articles. The three factors presented were visual quality, factual quality, and writing style. Students reported factual quality

to be the most important factor, with all students expressing either agreement or strong agreement with the statement. The next most important factor identified was the visual quality. For this statement, a wider spread of responses was received from disagree to strongly agree. Writing style returned a similar spread of responses, with a slightly lower average, but still with general agreement. Very few students responded as unsure to any of these statements (one each for visual quality and writing style).

Respondents were given the opportunity to respond freely if they felt there were other factors they felt important. Two respondents made comments that language used in articles should be easy to understand, with one emphasising the importance of clear descriptions. Two respondents expressed that organisation of information should well thought out. Two respondents also said that articles should be written to allow for a wide audience.

> Organisation of text matters a lot. It should be in a continuous flow with simple meaning of words - so that even a novice person can understand the concept.

One student provided a view on how ratings impact viewers.

> If a viewer of the page sees a high rating they are more inclined to read on where as if it were a lower rating they wouldn't be as much.

Participants were questioned about the group exercises they were asked to complete using the wiki. Although there was no strong agreement with the statement, eight reported the group exercises as easy, while the remainder were undecided. Most respondents were confident in understanding the game they chose to study. Eight responded positively to the statement, with one of those a strong agreement. The remainder were undecided with the exception of one who found understanding the game a challenge. When asked what was found difficult about completing the POD exercises, the most common response was unfamiliarity with computer games, with three such responses. Two respondents reported finding a game to study a challenge, however no participant explained the reason for this. One participant also cited poor personal organisation and time management as an issue, while another found it a challenge getting to know the other POD members they were assigned to work with.

While students at universities are being required to adopt various methods of information and communications technology, a wiki is a much more unrestricted and public space. Students were asked to rate how comfortable they were contributing to the wiki. All students responded positively, with the exception of one who declined to respond. Of those who responded, three students indicated they were strongly confident.

Students were asked to describe further their feelings working in such an open environment. Students were provided with a short list of words, excited, enthusiastic, proud, confident, indifferent, nervous, unsure, confused, and shy, and asked to provide three words, either from the list, or of their own, that describe how they felt contributing content to the wiki. In total eight responses were received, including about 19 single word answers, and three longer descriptions. These longer descriptions were simplified to single words, or short phrases, creating 23 words or phrases in total. These words and phrases were studied and grouped into five categories, representing different sentiments. These groupings were "strongly confident", "positive response", "neutral", "relief", and "doubting" (see table 2).

Table 2: Distribution between categories of students feelings when using wikis

Category	Number of Responses	Percentage	Common expressions
strongly confident	11	48%	"proud" (4), "confident" (3), "enthusiastic" (2), "excited", "helpful"
positive response	5	22%	happy once completed, "good", "unabashed", "achievement", "good experience"
neutral	3	13%	"indifferent" (2), "blasé"
relief	2	9%	"relief" (2)
doubting	2	9%	"unsure", "nervous"
total	**23**	**100%**	

While some students used three words to describe similar feelings, there were also instances of varied feelings in combination. Three students expressed a mix, of a sense of achievement, and of relief, while another expressed enjoyment, while still being unsure about their contributions.

Students were asked to elaborate on their feelings by explaining their choice of words. A mixed response was received. Two responses expressed a lack of special enthusiasm of the wiki as a medium, that the only reason for participation was the completion of their required class-work. "It just felt like placing an article online for people to read", and is "[not] something to go crazy about". Another responded "it was an assignment. I probably wouldn't do it out of my own interest in Wikis".

Two respondents explained their relief came from having completed another university assignment task. One respondent however, as well as expressing relief, explained they were proud to have contributed to their group, despite they were unsure how their work would be received by others.

One reportedly excited and enthusiastic student was particularly interested in the outcome of the wiki, stating the activities were "something different", and that they were "keen to see how the Wiki would turn out". Two other students were enthusiastic and interested in the medium. One pointed out the importance of online communities, and that "to share our ideas and arguments is obviously a good thing". Another was pleased to have a space where they could "contribute [their] ideas and knowledge, sharing with other people", and likewise, to "learn different ideas and information from [other people]". "I felt enthusiastic, proud and confident when I posted my contributions".

Throughout the written feedback, there were several general comments about using the wiki. One student explains how they overcame problems when trying to understand and write wiki-text:

> Whenever I had a problem I just looked at another page (or looked at the code in the Wikipedia - the one where you add your own article) and found the answer in about five seconds.

This comment shows a level of problem-solving ability, similar to that of hacker cultures (Raymond 2006), a personality believed to be common among wiki contributors.

Several responses, all positive in nature, were received regarding the personal learning experience of using the wiki. One expressed pride over using a wiki in this subject for the first time, while another rejoiced upon the new learning methods, and knowledge they gained through using online tools.

One student summed these sentiments up in their response:

> This has been a very useful experience for me. I enjoyed the fact you can collaborate your work with others over the net. I like my group because everyone has contributed something in the wiki. It makes it so much easier to do tasks and it doesn't boggle your mind. I enjoyed the fact (even though I didn't do it all the time) that you can write whatever is in your head and not worry about it.

This response exemplifies several important features of wiki communities. Stallman (1999) explained how small contributions to wikis are important, and how wikis work as a communication and brainstorming technology, where users can contribute ideas and learn from others.

Concluding questions and comments

Are there any mechanisms by which the community (or a subset) can provide some level of authority?

Two methods were trialled in this research in a small wiki. While neither provided accurate results in this setting, further research needs to be done with larger and established wikis. Further research may also develop alternate methods to test.

Can ratings made by users be reliably used to identify quality articles?

In small education wikis, the answer is no. Comparison of system generated ratings with manually assessed ratings showed little correlation. This analysis did find that the vast majority of system ratings were positive, with at least 78% of ratings found in the top 40% of the rating scale. Dellarocas (2001) and Resnick and Zeckhauser (2002) also found an overwhelming number of positive ratings when studying

eBay ratings. In this trial, biases towards other members were identified as a possible factor reducing the accuracy of user ratings. The participant questionnaire determined that this may be the significant factor. This fact may reduce in significance as the size of the community increases, and the likelihood of interaction between friends lowers.

Can attention data be used in an wiki environment to estimate the quality of an article?

In small wikis, the answer is no. Analysis of data showed some correlation between the time spent rating pages, and their quality. This effect may however be useful in a larger wiki with a larger set of attention data. Server logs as an attention metric also poses its limitations. Client side monitoring would provider richer data, allowing the researcher to have a better idea if the user was actually reading a page, had simply left the page open in the browser while working on another task, or closed the browser entirely.

The need for further research

Observations made during this research highlight the behavioural differences between small and large wikis. Wikipedia is a common target of study, due to the need to solve problems with its reliability. There is comparably little study done on small and medium wikis. There is a need for future work to study the dynamics and interactions of smaller wikis, determine a software tool-set that best fits their needs, so that they can be most effectively used. Further work is also needed to understand how best to design and manage small wikis in educational settings.

This research observed a high number of potentially "biased" ratings. These ratings were made by participants who rated the same pages that they edited. Further work can determine firstly if user ratings produce reliable recommendations in larger wikis and in addition, if the high number of such ratings is a feature only of small wikis, and if such ratings are indeed inaccurate. Results showed a high number of positive ratings. This has also been observed in communities such as eBay (Dellarocas 2001, Resnick & Zeckhauser 2002), however Malda (1999) through his work has created a system (and community) that generates more accurate ratings.

Analysis in this research showed inconsistencies between the manual ratings, and the system generated ratings, so one pathway for further research is the question:

- Is there a need for some form of training so that users understand how articles should be critiqued and assigned an accurate rating?

Established wikis form a culture, and with it a set of norms, expectations and guidelines (written or otherwise), that new members learn and follow when joining the community. This posed a final question to investigate:

- Is training required to members in private (corporate) and educational wikis to act as a surrogate to cultivate an effective wiki in its early stages?

How effective are wikis in educational settings?

Observations of the wiki found little interaction between participants. While it was rare to see any interaction where students posted their personal assignment tasks, most shared (group) pages experienced a high level of collaboration, and evolved quickly. These pages saw students adopt a shared presentation style, and in some cases, a form of group identity, where the group adopted a shared name.

The Georgia Institute of Technology, through the use of their CoWeb wiki (Leuf and Cunningham 2001) found that in the right conditions, students form a group identity and shared respect. Students also find the wiki an enjoyable and efficient medium for discussion, learning, and sharing of ideas. Likewise this research discovered that some students identified the potential for shared learning and collaboration. Others saw it simply as a form of publishing.

Parker & Chao (2007) described the current status of the evolving use of wikis in education. This research supports the use of wikis in an educational context along with the authors' previous experiences with using wikis in small groups (6 to 30 members) in a mixture of on-campus and distance education modes, sharing the same wiki space as a cohesive unit.

References

Charles Sturt University 2006, 2006 Undergraduate Handbook, electronic version, viewed 8 November 2006, http://www.csu.edu.au/handbook/subjects/ITC213.html

Dellarocas, C 2001, Analyzing the Economic Efficiency of eBay-like Online Reputation Reporting Mechanisms, electronic version, ACM Conference on Electronic Commerce EC'01, Tampa, Florida, USA, viewed 14 February 2006, http://ccs.mit.edu/dell/papers/ec01.pdf

Eustace, K 2006, ITC213 Subject Outline, electronic version, Charles Sturt University, viewed 9 November 2006, http://ispg.csu.edu.au/subjects/cscw/pods/instructions

Eustace, K. & Hay, L. 2000, A community and knowledge building model in computer education. In A.E. Ellis (Ed.), Proceedings of the Australasian Conference on Computing Education (pp. 95-102). New York: ACM Press.

Goodyear, P 1998. 'Integrating Information and Communication Technology in Higher Education (BITE)', Maastricht, March 25-7 1998.

Graham, P 2005, 'What Business Can Learn from Open Source', talk at O'Reilly Open Source Convention, viewed 24 March 2006, <http://paulgraham.com/opensource.html>.

Laurillard, D 2002. Rethinking University Teaching: A Conversational Framework for the Effective Use of Learning Technologies. 2nd ed. London: Routledge

Leuf, B & Cunningham, W 2001, The Wiki Way - Quick Collaboration on the Web.

Malda, R 1999, 'Slashdot Moderation', last edited 9 September, viewed 18 December 2005, <http://slashdot.org/moderation.shtml>.

Mason, R. 2003. 'Rethinking Assessment for Online Education' In: Distance Education and Distributed Learning (ed. C. Vrasidas), Information Age Publishing.

McHenry, R 2006, 'The Faith-Based Encyclopaedia Blinks', Technology Commerce Society Daily, viewed 6 September 2006, http://www.tcsdaily.com/article.aspx?id=121305E

Orlowski, A 2005, 'There's no Wikipedia entry for 'moral responsibility', last edited 12 December, The Register, viewed 6 September 2006, http://www.theregister.co.uk/2005/12/12/wikipedia_no_responsibility/page2.html

Parker, K R & Chao J T 2007, Wiki as a Teaching Tool, Interdisciplinary Journal of Knowledge and Learning Objects Volume 3, 2007

Preece, J 2000, Online Communities - Designing Usability, Supporting Sociability, John Wiley & Sons, West Sussex, England.

Rashid, AM, Ling, K, Tassone, RD, Resnick, P, Kraut, R & Riedl, J 2006, 'Motivating Participation by Displaying the Value of Contribution', Proceedings of ACM CHI 2006 Conference on Human Factors in Computing Systems, pp.955-958, viewed 10 March 2006, http://www.si.umich.edu/~presnick/papers/CHI06/

Raymond, ES 2006, How To Become A Hacker, electronic version, http://www.catb.org/~esr/faqs/hacker-howto.html

Resnick, P & Zeckhauser, R 2002, 'Trust Among Strangers in Internet Transactions:Empirical Analysis of eBays Reputation System', electronic version, Baye, MR. (ed.), Advances in Applied Microeconomics, 11, viewed 12 October 2006, http://www.si.umich.edu/~presnick/papers/ebayNBER/index.html

Sanger, L 2002, 'Wikipedia and why it matters', last edited 16 January, talk delivered at the Stanford University Computer Systems Laboratory EE380 Colloquium, viewed 28 August 2006, http://meta.wikimedia.org/wiki/Wikipedia_and_why_it_matters

Schwall, J 2003, 'The wiki phenomenon', viewed 27 August 2006, http://www.schwall.de/dl/20030828_the_wiki_way.pdf

Stallman, R 1999, 'The Free Universal Encyclopaedia and Learning Resource', viewed 19 October 2006, http://www.gnu.org/encyclopedia/free-encyclopedia.html

Wikipedia Contributors 2006a, 'Wiki', last edited 31 July, viewed 31 July 2006, http://en.wikipedia.org/w/index.php?title=Wiki&oldid=66792603

Wikipedia Contributors 2006b, 'Wikipedia:Don't bite the newcomers', last edited 7 Nov, viewed 9 Nov 2006, http://en.wikipedia.org/w/index.php?title=Wikipedia:Please_do_not_bite_the_newcomers&oldid=86176581

Trevor Peacock, School of Computing and Mathematics, Charles Sturt University
Email: tpeacock@csu.edu.au
Geoff Fellows, Lecturer in Computing, School of Computing and Mathematics, Charles Sturt University
Email: gfellows@csu.edu.au
Ken Eustace, Lecturer in Computing, School of Computing and Mathematics, Charles Sturt University
Email: keustace@csu.edu.au