Action research as a congruent methodology for understanding wikis: the case of Wikiversity

Cormac Lawler

School of Education,
University of Manchester,
Oxford Road, Manchester,
M13 9PL, UK
www.cormaggio.org

Abstract: It is proposed that action research is an appropriate methodology for studying wikis, and is akin to research 'the wiki way'. This proposal is contextualised within the case of Wikiversity, a project of the Wikimedia Foundation. A framework for a participative research project is outlined, and challenges and implications of such a methodology are discussed.

Keywords: Action research, wikis, Wikiversity

1 Introduction

The rapid rise of wikis over the last few years has offered opportunities for educators, but also raised implications for their deployment (Raman, Ryan, Olfman, 2005). Similarly, applying research questions to wikis raises new methodological challenges – even though they are rooted in long-standing issues and practices within the social sciences (Jankowski, van Selm, 2004). With this in mind, I intend to present action research as a deeply congruent, and therefore appropriate methodology for understanding wikis, and I will do so by detailing my research and work on a particular wiki, Wikiversity – a Wikimedia Foundation project to develop open learning resources and communities. This research is open, participative, and developmental, and seeks to address questions around Wikiversity as an emergent educational space. Since the 'action' part of this research hasn't yet fully begun, this paper can only be seen as a hypothesis – but I hope that to an extent, this research approach will shed light on a methodology for studying wikis.

1.1 Wikis

Wikis are websites that are editable by their readers, generally known through the rising popularity – and perhaps notoriety – of Wikipedia, "the encyclopedia that anyone can edit" (Wikipedia, 2008c). Potentially a recipe for disaster (e.g. Glaister, 2005), a wiki works through the collaborative efforts of a community of people who are convened around the goals of the particular wiki, and who work to maintain and develop the content and goals of the wiki (Lamb, 2005). With regard to the obvious question of their susceptibility to vandalism, Linus's law – that "with enough eyeballs, all bugs become shallow" (Raymond, 1998) – is often cited as analogous to the way wikis work (Bryant, 2006). With many people watching a wiki's recent changes (at least on an active wiki, like Wikipedia), vandalism is usually detected and remedied quickly (Viégas, Wattenberg, Dave, 2004). However, of course, this assurance only goes so far in addressing concerns about the implications of a wiki's modus operandi. Thus Wikipedia has generated much debate, particularly within academia, which has produced perspectives ranging from Wikipedia as a form of Habermasian rational discourse (Hansen, Berente, Lyytinen, 2007) to a flawed and non-trustworthy source (McHenry, 2004; Jakubovitz, Paul, 2006).

The way that a wiki works is also echoed in the way that its community acts – known as the 'wiki way'– a culture of openness, sharing, and collaboration (Leuf, Cunningham, 2001). In fact, 'wiki' has become almost synonymous with a mode of working in general – I have heard people describe a process or organisation as being "kinda wiki" or "like Wikipedia" when it is to some extent open and/or collaborative, even if it has nothing to do with being online, community-run, or other inherent

qualities of a wiki. Wikis have not only captured the public's imagination; they have changed the world (Benkler, 2002), and this was explicitly recognised by Time magazine when it selected "you" as its person of the year in 2006 (Grossman, 2006), with Wikipedia as one of the archetypal examples of this new, collaborative culture.

A wiki is in constant change – it is a text in continual negotiation. In such a fluid and discursive medium (Viégas, Wattenberg, Kriss, van Ham, 2007), participants can edit, critique, praise, and even remove the contributions of other participants. The 'wiki way' is based in collaboration, and in large part on goodwill (Wagner, Prasarnphanich, 2007). However, it would be naïve to suggest that wikis work in a completely harmonious fashion – collaborative work inevitably generates conflict (Matei, Dobrescu, 2006), and it is up to the participants of a wiki to ensure that their conflicts yield productive (Shah, 2005) or even educational results (Lawler, 2005). Of course, this latter issue of how conflicts can be managed so as to contribute to learning becomes an educational question, and a challenge to any wiki devoted to education.

One final aspect to note here on wikis is their transparency. Wiki pages are iterative, with each edit to a page creating a new version, and with each version of a page replacing the last, all of which are saved and can be tracked through the "history" page or function. In this way, a wiki affords the building of a rich picture of how a page, or set of related pages, have been developed through time, by whom, and what individual contributors have done or said about particular contributions (Viégas *et al.*, 2007).

1.2 Wikis and education

Wikis are being applied in many arenas of work, and increasingly so in educational contexts (e.g. Honegger, 2005) – judging by the proliferation of wiki-related articles in educational and other journals. Many educators run 'private' wikis for use within a specific class (i.e. the wiki can only be edited by a limited number of people), sometimes within a learning environment (e.g. Minocha, Thomas, 2007). As well as in the 'delivery' of a course, wikis have been used to stimulate the work and learning of a group of educators, e.g. Da Lio, Fraboni, Leo (2005), who used their wiki as a 'knowledge base' – a common usage of wikis across all contexts.

Unsurprisingly, from the beginning, wikis have been used to facilitate collaborative writing projects (Guzdial, 1998) – these projects are normally within a self-contained, private wiki, but some educators have designed their students' assignments to write articles for Wikipedia itself, in order to get experience of writing for a wider audience and receiving broader feedback (Groom, Brockhaus, 2007). Wikis can be put to other educational uses than collaborative writing, including brainstorming, planning, discussing, and even ice-breaking (Augur, Raitman, Zhou, 2004). Overall, I think Bruns and Humphreys (2005: 27) state it well when they describe learning in a wiki environment as: "learning technical literacy, content creation in a digital environment, the art of collaboration, consensus building, creating explicit knowledge from tacit understanding, and effectively communicating ideas to other people through networked knowledge environments".

Of course, taking part in any community involves a learning dimension, for example in learning about the community's work and norms and in negotiating one's identity in relation to that culture (Lave, Wenger, 1991; Wenger, 1998). Bryant, Forte, Bruckman (2005) noted the trajectory of participants in Wikipedia as they 'become Wikipedians', moving from peripheral to more 'core' participation – for example, simply setting up an account and entering into discussions with other participants; or moving from simple copyediting, like checking spelling and grammar, to more involved work, like mediating conflicts between participants. However, this issue of participation is an ever-present challenge to people using wikis for educational purposes, and normally requires that participants in a wiki-run course are to some extent 'wiki-savvy', or, if not, that sufficient support is given both before and during the course (Raman *et al.*, 2005)

The technical dimension is significant in that the MediaWiki software on which Wikimedia projects run (there are other wiki platforms) was never conceptualised or designed as an educational platform, and it has obvious limitations with regard to specific activities, or modes of working (Reinhold,

Abawi, 2006). For example, there is no way for a researcher or educator of tracking participation of the user (perhaps a student) – unless the user edits the site while logged in. This contrasts with other learning environments, such as Moodle, where even logging in and out of the site is a trackable action, and therefore possible to reveal something about the way in which the space is being used, and by whom. Of course, as well as the content of Wikiversity being editable, MediaWiki, along with most wiki platforms, is open-source, meaning that it can be modified and tested by a community of developers – and such work is ongoing to extend the functionality of wikis for educational usages (Reinhold, Abawi, 2006).

2 Wikiversity

Wikiversity is a project of the Wikimedia Foundation – the non-profit organisation behind Wikipedia, and other wiki-based projects (Wikipedia, 2008b). Set up in August 2006, Wikiversity exists for three main purposes:

1. to develop and host educational materials (such as videos, guides, essays, interactive quizzes, lesson plans, etc.);
2. to provide a space in which to develop learning activities and communities;
3. to facilitate research projects and host research results.

From this mission, it can be seen that Wikiversity is both a repository of learning resources, and a space for active learning. However, the process of how it carries out this mission is still being explored, continuing a long debate around the scope of the project within the Wikimedia community, before and since its setting up, and particularly around its relationship with other Wikimedia projects, such as Wikibooks.

Partly as a result of this debate, Wikiversity was set up with an explicitly experimental nature (Wales, 2006), and with an open question around how educational activities could be pursued in a wiki context. The major response to this question so far has been the model of 'learning by doing' (Dewey, 1997) – the idea of learning about something by experiencing it, sometimes called 'experiential learning' – and, significantly, similar to action research (McPherson, Nunes, 2004: 13-16). In practice, however, this model is yet to be fully understood or robustly implemented in the context of Wikiversity, and remains an ongoing challenge for the Wikiversity community (Lawler, 2007). There are many other challenges, not least cultural ones – related to received images and experiences of education (e.g. related to the "sage on the stage"), as well as a cultural reticence of educators to edit another educator's materials. Of course, addressing mistrust of openly editable processes and openly edited content is part of this work; debates around whether 'editability by all' is a cause for celebration or disdain has created an academic backdrop for Wikiversity's work – especially in the evolving context of knowledge, education and the university (Tiffin, Rajasingham, 2003).

Wikiversity serves and involves a diverse set of people – and, being a voluntary operation, individuals' involvement or participation can range from core to peripheral, and indeed oscillate between these poles (Lave, Wenger, 1991). Figure 1 is a simplified and non-exhaustive map of Wikiversity's stakeholder groups with varying degrees of participation, incorporating participants of other Wikimedia projects, educators, general users (readers, learners, editors), and developers. In practice, there is a much wider variety of "user" roles – including content developers and editors, peer reviewers, admins (in Wikiversity, called "custodians"), stewards – as well as more organisational roles, like committees, boards, and, more recently, staff. With the exception of the latter, these roles are voluntary and mostly authorised by, or at least accountable to, community processes. It is also important to note that 'the Wikiversity community' is, like all Wikimedia projects, a collection of volunteers with various self-selected, community-authorised roles – but also an umbrella for the communities of the individual language projects: at the time of writing in English, French, German, Greek, Italian, and Spanish, as well as a multilingual coordination wiki. I use this to indicate that the Wikiversity community, like all such endeavours, is a complex context (Barab, Schatz, Scheckler, 2004), and further note that it fits within even wider contexts such as the open educational resources

(OER), open source, and general free culture movements (Atkins, Seely Brown, Hammond, 2006; Lessig, 2004).

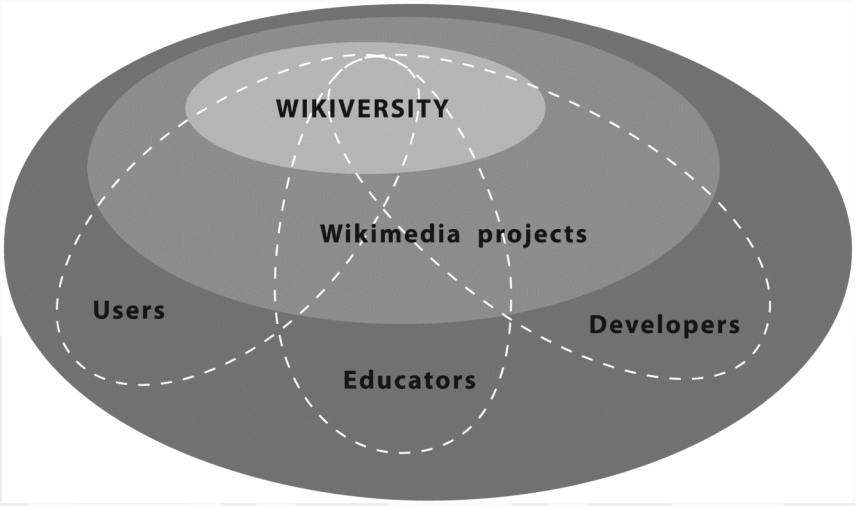

Figure 1: Wikiversity's community and stakeholders

In its Wikimedia context, Wikiversity has to an extent inherited some of the practices of Wikipedia – though it also strives to define itself on its own terms. This includes, for example, the development of a set of policies around how to include and manage research – which is explicitly banned from Wikipedia, and Wikibooks – and which provided one of the rationales for becoming a separate project. Another example is neutrality – a central "pillar" of Wikipedia in its 'neutral point of view' (NPOV) policy (Wikipedia, 2008a). Wikiversity does acknowledge and encourage the use of NPOV – for example, in showing awareness of a broad discourse within an academic discipline – but it also permits going beyond it, by allowing "point of view" materials, and encouraging people to disclose their biases, thereby offering grounds for understanding and critiquing contributions (Wikiversity, 2008b).

Tonkin (2005) makes the practical point that a wiki platform should be chosen with a specific group of users in mind, and with features that address their needs. As already mentioned, Wikiversity is intended to cater for a wide range of users – learners and educators of all learner levels in any subject, wiki experts and novices, people of all languages, cultures, etc. – all of whom have specific needs. Given this, and the previously discussed limitations of MediaWiki, it is an ongoing project for the Wikiversity community to identify what features it should have to address particular needs, and to organise these features to be added to the MediaWiki codebase.

3 Research and methodology

Bearing in mind the stakeholders, needs, and opportunities for development already outlined, I will now move on to elaborate a research strategy appropriate to the context, and which can involve a diverse set of stakeholders. My working research question is based on the learning model question that Wikiversity has been set up to address, i.e.: *how can the Wikiversity community facilitate opportunities for learning in a wiki context?* As a result of reflecting on the previously discussed challenges for Wikiversity, the research agenda that I deal with in this paper is *learning about learning* – it focuses on the activity and experiences of the community who are building Wikiversity, and its learning projects and communities (i.e. the second of the three aspects of Wikiversity's mission outlined above), rather than on people using Wikiversity to further their own learning about a particular subject. However, because this research is intended to reflect and serve a diverse set of stakeholders and needs, the ways in which this question is applied are themselves in negotiation, and input is not limited to 'facilitators' – a stance consistent with action research (Carr, Kemmis, 1986).

3.1 Action research

Action research takes to heart Kurt Lewin's adage that in order to understand a system we need to try to change it (Schein, 1996: 34). This can be parsed into two interrelated questions: what does it take to change a given system? (i.e. how and why does a system resist change?); and how does the process of changing a system develop our knowledge about that system? Action research is an approach to a situation/system which is explicitly about not just understanding but improving that situation/system – Elliott (1991: 69) describes it as "the study of a social situation with a view to improving the quality of action within it." However, it is important to point out that the studying of the social situation is undertaken as an intrinsic part of the process of action-taking and reflection, rather than something which is seen as a discrete, diagnostic step, 'outside' or prior to action (Schein, 1996: 34-37).

An action research project will typically go through a number of phases, outlined by Carr and Kemmis (1986: 186) as the 'moments' of action research: 1) planning action (including or sometimes being preceded by reconnaissance); 2) implementing action steps from plan; 3) observing effects of action steps, and 4) reflecting on action, the 'results' of which are fed into a new phase of planning, acting, and so on, in a 'spiral' movement (Lewin, 1999: 269). These 'moments' are developmental and iterative, but are also simultaneously looking forwards and backwards, in a "tension between retrospective understanding and prospective action" (Carr, Kemmis, 1986: 186).

While difficult to define action research as a coherent methodology – it may be more accurate to describe it as a 'meta-methodology' (Dick, 2001) – it certainly indicates a particular approach or attitude to research: in its rootedness in change, and usually, though not strictly necessarily, its emphasis on the participation of key stakeholders. Reason and Bradbury (2006: 10) place emphasis on participation in knowledge building, calling it an "educative imperative"; Heron and Reason (2006) advocate research *with* rather than *on* people; and Fals Borda (2006: 31) broadens the concept, by stating that action research is not only a methodology, but "a philosophy of life", echoing the work of Paulo Freire (Freire, 1996), as well as Kurt Lewin (Schein, 1996). Also, significantly, action researchers "see the development of theory or understanding as a by-product of the improvement of real situations, rather than application as a by-product of advances in 'pure' theory." (Carr, Kemmis, 1986, p. 28) In other words, knowledge is built through change – and, in this way, it is intended that the theory or knowledge generated is appropriate to the context and its participants.

Applied to an educational context, McPherson and Nunes have developed a useful action research model, encompassing the organisational context, pedagogic model, educational setting, and evaluation process (McPherson, Nunes, 2004: 27-29). It is also worthwhile to reflect on the fact that the research I am describing takes place within an online context – which are often quite amorphous and flexible in their boundaries (Foth, 2006; Barab *et al.*, 2004). Given the previously discussed range of involvement around this research context, action research can serve to incorporate this diversity within each component of the framework proposed by McPherson and Nunes, and to use the framework to shed light on different aspects and modes of participation. Learning about learning in Wikiversity will involve a broad and critical participative domain around the organisational context, and cultures, assumptions, and models that form individual and collective practices in Wikiversity, and that are themselves transformed through these practices.

3.2 Rationale for action research – research the 'wiki way'

I hope to have outlined above enough about both wikis and action research to have offered a glimpse of how they are compatible – but it is worth clarifying and consolidating here. I believe that action research is akin to 'research done the wiki way' – it is participative, collaborative, emergent, iterative, and, at all times, it is subject to the critique (and counter-critique) of anyone who cares to comment. A wiki shares all of these qualities, as well as affording the development and structuring of materials to facilitate a research process (Buffa, Sander, Grattarola, 2004; Nicol, Littlejohn, Grierson, 2005; Sauer, Bialek, Efimova, Schwartlander, Pless, Neuhaus, 2005). Carrying out action research in an educational wiki context answers Atkins, Seely Brown and Hammond's (2007) call for such research to investigate the deeper implications of such open and participatory learning environments.

Action research and wikis share not only key features, but also key attitudes. Wikis are seen to be democratic and even empowering (Ebersbach, Glaser, 2004; Salz 2005), as is action research (Lewin, 1944; Reason, Bradbury, 2006); action research is about changing a situation (Elliott, 1991), and wikis are in constant change, and have been used as agents of change in work settings (Fuchs-Kittowski, Köhler, 2005). It is for this reason that I see the two as congruent with each other – and I see this congruence both in how they work (methodologically), and in how they build knowledge (epistemologically).

3.3 Implementing action research

In terms of methods, it is always possible and sometimes desirable to conduct interviews, and administer questionnaires – but I feel, given that a wiki is such a collaborative, discursive space, that it is also appropriate to use the wiki *as a methodology*, as well as simply the research context. By this I mean that it is possible to conduct research by participating in a wiki – just as in any ethnographic, participant-observer approach – and to use the affordances of the wiki (e.g. co-creating resources, discussing, and 'refactoring' discussions into educational or otherwise usable material) to carry out the bulk of the rest of the research (data generation and presentation, and discussion, or 'co-validation').

The collecting of data is from the everyday spaces of the community – which means it is within its own rich context and in its full diversity of 'voices' (Mautner, 2005). As well as this, the action is itself within the wiki – not only in terms of discussions, but also in the ongoing 'jumping in and editing' nature of a wiki's work. The transparency of the wiki is important here, in keeping a record of editing (through the 'history' function) – and this allows for critique of the particular selection of data, or the reflections or conclusions it provokes. Another useful, or perhaps *essential* method is to encourage personal blogging of participants to facilitate self-reflection on action – and this can be done via the wiki, or more dedicated blogging software, as is more common. This offers ways for people to participate without having to edit the 'public workspace' – and it also underscores that such research need not take place exclusively in the domain of the wiki.

More specifically regarding this research I am outlining, the scope and agenda have been collaboratively developed on a wiki page (Wikiversity, 2008a) and through other community fora, from which various wiki workspaces have been developed. The 'action' of the research will consist of both developing spaces and resources for learning, and discussing aspects and implications of such developments. Discussion is also a reflective component of the process, which will also incorporate individual reflections on blogs, 'personal' wiki pages, and other spaces – and synchronous focus groups will be carried out to work towards the project's goals. In order to inform this process, I have set up wiki pages to explore individual perspectives on learning; however, this research does also constitute my own PhD research, toward which I will be carrying out interviews, which may or may not feed into more 'public' spaces, according to participants' wishes. Nevertheless, the research agenda is itself openly 'editable' – and is designed so as to allow anyone participate as they see fit.

4 Implications and challenges

One of my own aims - and I've said so explicitly in Wikiversity - is to embed a culture of action research and critical thinking within the praxis of Wikiversity – and this involves the development of a community of practitioners who can help collaboratively define and develop Wikiversity. In order to be able to do this, the community needs to have reference to a shared body of knowledge – including previous research, as well as educational perspectives that each member brings. Of course, this body of knowledge is not a given and static repository, but a living, actively constructed one (Wagner, 2004) – and part of the work, therefore, involves making explicit the various perspectives and aspirations that each participant brings to this research project, in order to collaboratively define its means as well as its ends. In its ideal, this would approach Habermas' (1987) idea of a "lifeworld", where people can "reciprocally raise claims that their utterances fit the world (objective, social, or subjective), and where they criticize and confirm those validity claims, settle their disagreements, and arrive at agreements"

(Habermas, 1987: 126). However, I do not wish to imply that agreements are necessarily the ideal, but acknowledge that disagreements are part and parcel of an educational process (Frankham, 2006).

The role of the researcher is always important, and as someone who has been actively involved in the development of Wikiversity since before its setting up, I must acknowledge my "privileged insider" position (Dagley, 2004: 616), though of course this also brings with it a personal challenge in becoming blinded by the 'everyday-ness' of my experience. My researcher stance so far (as distinct from my other roles within the community) has predominantly been ethnographic – as appropriate in an online context (Hine, 2003; Wittel, 2000) – and this has held throughout my involvement with Wikimedia projects. I have always seen my role on Wikiversity as a facilitator, but also a questioner – asking why something is so, or what makes someone say a particular thing, and what the implications of something are for the community. However, my participation raises ethical questions of how I manage my participation with recourse to both research and 'everyday' participation, as well as how I disclose this to fellow participants (Walther, 2002) – and I have attempted to be as open about my role and intentions as possible, and to design the research around these ethical considerations, rather than treat ethics as a necessary but inconvenient obstacle (Parker, 1999).

Action research is a means of engaging all relevant stakeholders – in other words, everyone who is potentially *affected* – in the scope and design of the research itself, and so it should give full opportunity for critique, dissent, and abstention from the research. It is an attempt to address ethical questions through transparency of process, and relinquishing control over the research from the researcher to the wider group in question. Similarly, it attempts to build 'co-validation' through ongoing discussion and checking to see whether consensus can be found on the meanings of the objects of research – even if this is always problematic in collaborative qualitative research (Gerstl-Pepin, Gunzenhauser, 2002).

A basic question, after the canonical explanation of how wikis work, is: how do wikis *actually* work in practice? Are they always as democratic and open as they purport to be? For example, there have long been community debates about transparency within the organisational aspect of Wikimedia, which run on the back of heavy discussion about the existence of private channels of communication within Wikimedia – all of which have generated a clear discourse of mistrust of Wikimedia's organisation and modus operandi amongst certain parts of the community. Also, with regard to openness and the egalitarian structure that is often attributed to wiki culture, there have been many and lengthy debates about hierarchy in Wikimedia projects, when one of a wiki's central features is often considered to be 'being flat' (Aigrain, 2003). With these debates in mind, I argue that action research – or certainly that with a critical flavour (Carr, Kemmis, 1986) – should be organised so as to provoke and enable the community to hold an unflinching mirror to itself and its practice, and to identify whether any appropriate action is needed.

Finally, I would note that an inherent feature of online interaction is the ambiguity of identity, and this very much applies on a wiki such as Wikiversity, where someone can edit without having to log in, meaning they are only identifiable by their computer's IP address. Technically, of course, this creates a means of tracing an edit to an individual computer, but doing so is bound by Wikimedia's privacy policy (Wikimedia Foundation, 2006), as well as practices of the internet service provider (ISP). In practice, much work on a wiki is based on trust and the assumption of good faith – a relationship of understanding that is built over time through sustained collaboration, and upon which a wiki is built (Wagner, 2007). I would leave it as an open question as to exactly how important it is to know the full identity of someone you are collaborating with online – though I personally like to get to know people, and to acknowledge that it can help in forming shared understandings, I also respect the privacy of anyone I encounter online as a basic human right, in the same way as I would respect their wish for anonymity in a published piece of research.

5 Concluding comments

Wikis and action research are congruent, both epistemologically and methodologically, to the extent that action research is akin to 'research, the wiki way'. Wikis fit perfectly into the 'participatory

paradigm' called for by Reason and Bradbury (2006), and build and expand on the significant, perhaps paradigmatic, changes that ICTs have brought to education (Harasim, 2000).

Having said this, I would like to sound a general note of caution here – not least for fear of being misunderstood – and this is that both action research and wikis are still ultimately human endeavours, and are subject to the very same and infinitely problematic features of human society than any other. Aspirations of empowerment, discernible in both strands of literature but particularly action research, must be mitigated against an awareness and understanding of acts and structures of power, culture, or any other dynamic that might stand in the way of someone understanding someone else, or someone's inability – for whatever reason – to participate in a given structure.

I see the transparency of wikis as offering a significant educational potential – in affording a detailed view of how a page has developed through time, who has contributed to it, and what this can tell us about the construction of knowledge and, indeed, how this can be used to show how knowledge *is constructed*. However, there is still much research to be done in understanding the ways in which these open, participatory wiki environments *really work* for learning; how they address the needs of a wide range of people, and how they can be developed with these people in mind. It is my hope that the research approach I've outlined here can play a role in understanding wikis, and "improving the quality of action" (Elliott, 1991: 69) within their applications in education.

6 References

Aigrain, P. (2003) The individual and the collective in open information communities, *16th BLED Electronic Commerce Conference*, 9th-11th June, 2003, Bled. Retrieved from: http://www.debatpublic.net/Members/paigrain/texts/icoic.html

Atkins, D. E., Seely Brown, J., Hammond, A. L. (2007) A review of the open educational resources (OER) movement: achievements, challenges, and new opportunities. Report to the William and Flora Hewlett Foundation. Retrieved from: http://www.oerderves.org/?p=23

Augar N., Raitman R., Zhou W. (2004) Teaching and learning online with wikis. *Beyond the comfort zone: Proceedings of 21st ASCILITE*, 5th-8th December, 2004, Perth, 95-104

Barab, S., Schatz, S., Scheckler, R. (2004) Using activity theory to conceptualise online community and using online community to conceptualise activity theory. *Mind, Culture, and Activity*, 11 (1), 25-47

Benkler, Y. (2002) Coase's penguin, or, Linux and The nature of the firm. *The Yale Law Journal*, 112 (3), 369-446

Bruns, A., Humphreys, S. (2005) Wikis in teaching and assessment: The M/Cyclopedia project. *Proceedings of WikiSym '05*, 16th-18th October, 2005, San Diego, CA

Bryant, A. (2006) Wiki and the agora: 'It's organising, Jim, but not as we know it'. *Development in Practice*, 16 (6), 559-569

Bryant, S., Forte, A, Bruckman, A. (2005). Becoming Wikipedian: transformation of participation in a collaborative online encyclopedia. *Proceedings of GROUP International Conference on Supporting Group Work*, 6th-9th November, 2005, Sanibel Island, FL, 1-10

Buffa, M., Sander, P., Grattarola, J. (2004) Distant cooperative software development for research and education: three years of experience. *International Conference on Computer Aided Learning in Engineering Education*, 16th-18th February, 2004, Grenoble. Retrieved from: http://www-clips.imag.fr/calie04/actes/Buffa_final.pdf

Carr, W., Kemmis, S. (1986) *Becoming critical*. Lewes: Falmer Press

Dagley, V. (2004) Making the invisible visible: a methodological and a substantive issue. *Educational Action Research*, 12 (4), 613-630

Da Lio, E., Fraboni, L., Leo, T. (2005) TWiki-based facilitation in a newly formed academic community of practice. *Proceedings of WikiSym '05*, 16th-18th October, 2005, San Diego, CA

Dewey, J. (1997) *Experience and education*. New York: Touchstone (Originally published 1938)

Dick, B. (2001) Utopia made practical? Action research comes of age. Review essay: Reason, P., Bradbury, H. (Eds.) (2001) Handbook of action research. *Forum: Qualitative Social Research*, 3 (1). Retrieved from: http://www.qualitative-research.net/fqs-texte/1-02/1-02review-dick-e.htm

Ebersbach, A., Glaser, M. (2004) Towards emancipatory use of a medium: the wiki. *International Journal of Information Ethics*, 2, November 2004, 70-77

Elliott, J. (1991) *Action research for educational change*. Buckingham: Open University Press

Fals Borda, O. (2006) Participatory (action) research in social theory: origins and challenges. In P. Reason, H. Bradbury (Eds.) *Handbook of Action Research (Concise Paperback edition)*. London: Sage

Foth, M. (2006) Network action research. *Action Research*, 4 (2), 205–226

Frankham, J. (2006) Network utopias and alternative entanglements for educational research and practice. *Journal of Education Policy*, (21) 6, 661-677

Freire, P. (1996) *Pedagogy of the oppressed*. London: Penguin (Originally published 1970)

Fuchs-Kittowski, F., Köhler, A. (2005) Wiki communities in the context of work processes. *Proceedings of WikiSym '05*, 16th-18th October, 2005, San Diego, CA

Gerstl-Pepin, C., Gunzenhauser, M. G. (2002) Collaborative team ethnography and the paradoxes of interpretation. *Qualitative Studies in Education*, 15 (2), 137-154

Glaister, D. (2005) LA Times 'wikitorial' gives editors red faces. *The Guardian*, 22nd June, 2005. Retrieved from: http://www.guardian.co.uk/technology/2005/jun/22/media.pressandpublishing

Groom, M., Brockhaus, A. (2007) Using Wikipedia to reenvision the term paper. *Educause 2007*, 23rd-26th October, 2007, Seattle

Grossman, L (2006) Time's person of the year: you. *Time Magazine*, 13th December, 2006. Retrieved from: http://www.time.com/time/magazine/article/0,9171,1569514,00.html

Guzdial, M. (1998) Collaborative websites to support an authoring community on the web, Unpublished paper. Retrieved from: http://guzdial.cc.gatech.edu/papers/CoWeb-resubmit.pdf

Habermas, J. (1987) *The theory of communicative action, Vol. 2*. Cambridge: Polity Press

Hansen, S., Berente, N., Lyytinen, K. (2007) Wikipedia as rational discourse: an illustration of the emancipatory potential of information systems. *Proceedings of 40th Hawaii International Conference on System Sciences*, 3rd-6th January, 2007, Hawaii

Harasim, L. (2000) Shift happens: online education as a new paradigm in learning. *The Internet and Higher Education*, 3 (1-2), 41-61

Heron, J., Reason, P. (2006) The practice of co-operative inquiry: research 'with' rather than 'on' people. In P. Reason, H. Bradbury (Eds.) *Handbook of Action Research (Concise Paperback edition)*. London: Sage

Hine, C. (2003) *Virtual ethnography*. London: Sage

Honegger, B. D. (2005) Wikis – a rapidly growing phenomenon in the German-speaking school community. *Proceedings of WikiSym '05*, 16th-18th October, 2005, San Diego, CA

Jakubovitz, J., Paul, D. (2006) Wide world of Wikipedia. *The Emory Wheel*, 21st April 2006. Retrieved from: http://www.emorywheel.com/detail.php?n=17902

Jankowski, N. W., van Selm, M. (2004) Epilogue: methodological concerns and innovations in internet research. In C. Hine (Ed.) (2004) *Virtual Methods*. Oxford: Berg

Lamb, B. (2005) Wide open spaces: wikis, ready or not. *Educause Review*, 39 (5), 36–48

Lave, J., Wenger, E. (1991) *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press

Lawler, C. (2005) Wikipedia as a learning community: content, conflict and the 'common good'. *Wikimania '05*, 4th-8th August, 2005, Frankfurt. Retrieved from: http://meta.wikimedia.org/wiki/Transwiki:Wikimania05/Paper-CL1

Lawler, C. (2007) Learning and learning about learning in Wikiversity. *Wikimania '06*, 3rd-5th August, 2007, Taipei. Retrieved from: http://wikimania2007.wikimedia.org/wiki/Proceedings:CL1

Lessig, L (2004) *Free Culture*. New York: The Penguin Press. Retrieved from: http://free-culture.org/freecontent/

Leuf, B., Cunningham, W. (2001) *The wiki way: collaboration and sharing on the internet*. Boston: Addison-Wesley

Lewin, K. (1944) The dynamics of group action. *Educational Leadership* 1 (4), 195-200

Lewin, K. (1999) Group decision and social change. In K. Lewin, M. Gold, (Ed.) (1999) *The complete social scientist: A Kurt Lewin reader*. Washington DC: American Psychological Association, 265-284. (Originally published 1948)

Matei, S. A., Dobrescu, C. (2006) Ambiguity and conflict in the Wikipedian knowledge production system. *56th Annual Conference of the International Communication*, 19th-23rd June, 2006, Dresden. Retrieved from: http://www.matei.org/ithink/papers/ambiguity-conflict-wikipedia/

Mautner, G. (2005) Time to get wired: using web-based corpora in critical discourse analysis. *Discourse & Society*, 16 (6), 809–828

McHenry, R. (2004) The faith-based encyclopedia. *Tech Central Station*, 15th November, 2004. Retrieved from http://www.techcentralstation.com/111504A.html

McPherson, M., Nunes, M. B. (2004) *Developing innovation in online learning: an action research framework*. London: RoutledgeFalmer

Minocha, S., Thomas, P. G. (2007) Collaborative learning in a wiki environment: experiences from a software engineering course. *New Review of Hypermedia and Multimedia*, 13 (2), 187-209

Nicol, D., Littlejohn, A., Grierson, H. (2005) The importance of structuring information and resources within shared workspaces during collaborative design learning. *Open Learning*, 20 (1), 31–49

Parker, I. (1999) Qualitative data and the subjectivity of 'objective' facts. In D. Dorling, S. Simpson, (Eds.) *Statistics in society: the arithmetic of politics*. London: Arnold

Raman, M., Ryan, T., Olfman, L. (2005) Designing knowledge management systems for teaching and learning with wiki technology. *Journal of Information Systems Education*, 16 (3), 311-320

Raymond, E. (1998) The cathedral and the bazaar. *First Monday*, 3 (3). Retrieved from: http://www.firstmonday.org/issues/issue3_3/raymond/

Reason, P., Bradbury, H. (2006) Introduction: inquiry and participation in search of a world worthy of human aspiration. In P. Reason, H. Bradbury (Eds.) *Handbook of Action Research (Concise Paperback edition)*. London: Sage

Reinhold, S., Abawi, D. F. (2006) Concepts for extending wiki systems to supplement collaborative learning. *Lecture Notes in Computer Science*, 3942, 755-767

Salz, P. A. (2005) Power to the people: Do It Yourself content distribution. *Econtent*, 28 (6), 36-41

Sauer, I. M., Bialek, D., Efimova, E., Schwartlander, R., Pless, G., Neuhaus, P. (2005) "Blogs" and "wikis" are valuable software tools for communication within research groups. *Artificial Organs*, 29 (1), 82–83

Schein, E. H. (1996) Kurt Lewin's change theory in the field and in the classroom: notes toward a model of managed learning. *Systems Practice*, 9 (1), 27-47

Shah, S. (2005) Controversy and stability: how wikis have productive conflict. *Wikimania '05*, 4th-8th August, 2005, Frankfurt. Retrieved from http://www.usemod.com/cgi-bin/mb.pl?ProductiveControversy

Tiffin, J., Rajasingham, L. (2003) *The global virtual university*. London: RoutledgeFalmer

Tonkin, E. (2005) Making the case for a wiki. *Ariadne*, 42, 30th January, 2005. Retrieved from: http://www.ariadne.ac.uk/issue42/tonkin/intro.html

Viégas, F. B., Wattenberg, M., Dave, K. (2004) Studying cooperation and conflict between authors with history flow visualizations. *Proceedings of SIGCHI*, 24th-29th April, 2004, Vienna. ACM Press, 575-582

Viégas, F. B., Wattenberg, M., Kriss, J., van Ham, F. (2007) Talk before you type: coordination in Wikipedia. *Proceedings of 40th Hawaii International Conference on System Sciences*, 3rd-6th January, 2007, Hawaii

Wagner, C. (2004) Wiki: a technology for conversational knowledge management and group collaboration. *Communications of the Association for Information Systems*, 13 (19), 265-289

Wagner, C., Prasarnphanich, P. (2007) Innovating collaborative content creation: the role of altruism and wiki technology. *Proceedings of 40th Hawaii International Conference on System Sciences*, 3rd-6th January, 2007, Hawaii

Wales, J. (2006) Opening plenary. *Wikimania '06*, 6th-8th August, 2006, Cambridge, MA. Retrieved from: http://wikimania2006.wikimedia.org/wiki/Opening_Plenary_%28transcript%29

Walther, J. B. (2002) Research ethics in internet-enabled research: human subjects issues and methodological myopia. *Ethics and Information Technology*, 4 (3), 205–216

Wenger, E. (1998) *Communities of practice*. Cambridge: Cambridge University Press

Wikimedia Foundation (2006) Privacy policy. Retrieved from: http://wikimediafoundation.org/wiki/Privacy_policy

Wikipedia (2008a) Neutral Point of View. Retrieved from: http://en.wikipedia.org/wiki/Wikipedia:Neutral_point_of_view

Wikipedia (2008b) Wikimedia Foundation. Retrieved from: http://en.wikipedia.org/wiki/Wikimedia_Foundation

Wikipedia (2008c) Wikipedia. Retrieved from: http://en.wikipedia.org/wiki/Wikipedia

Wikiversity (2008a) Developing Wikiversity through action research. Retrieved from: http://en.wikiversity.org/wiki/Developing_Wikiversity_through_action_research

Wikiversity (2008b) Disclosures. Retrieved from: http://en.wikiversity.org/wiki/Wikiversity:Disclosures

Wittel, A. (2000) Ethnography on the move: from field to net to internet. *Forum: Qualitative Social Research*, (1) 1. Retrieved from: http://www.qualitative-research.net/fqs-texte/1-00/1-00wittel-e.htm