

THE SHOEMAKER'S CHILDREN: USING WIKIS FOR INFORMATION SYSTEMS TEACHING, RESEARCH, AND PUBLICATION¹

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Abstract

This paper argues that Web 2.0 tools, specifically wikis, have begun to influence business and knowledge sharing practices in many organizations. Information Systems researchers have spent considerable time exploring the impact and implications of these tools in organizations, but those same researchers have not spent sufficient time considering whether and how these new technologies may provide opportunities for us to reform our core practices of research, review, and teaching. To this end, this paper calls for the IS discipline to engage in two actions related to wikis and other

Web 2.0 tools. First, the IS discipline ought to engage in critical reflection about how wikis and other Web 2.0 tools could allow us to conduct our core processes differently. Our existing practices were formulated during an era of paper-based exchange; wikis and other Web 2.0 tools may enable processes that could be substantively better. Nevertheless, users can appropriate information technology tools in unexpected ways, and even when tools are appropriated as expected there can be unintended negative consequences. Any potential changes to our core processes should, therefore, be considered critically and carefully, leading to our second recommended action. We advocate and describe a series of controlled experiments that will help assess the impact of these technologies on our core processes and the associated changes that would be necessary to use them. We argue that these experiments can provide needed information regarding Web 2.0 tools and related practice changes that could help the discipline better assess whether or not new practices would be superior to existing ones and under which circumstances.

Keywords: Web 2.0, Wiki, teaching, review, research, AIS, collaboration, academia

Introduction

An old proverb claims that shoemakers' children often go barefoot. The shoemaker focuses so much attention on helping his customers that his or her own family does not benefit from his expertise. We believe a similar condition currently exists within Information Systems as an academic

¹Carol Saunders was the accepting senior editor for this paper.

discipline. A new generation of Internet-based collaborative tools, commonly known as Web 2.0, has increased in popularity, availability, and power in recent years. The IS community has paid considerable attention to how these new tools can revolutionize business practices and create new business models (e.g., McAfee 2006; Wagner and Majchrzak 2006), but we have engaged in comparatively little discussion on whether or how these emerging technologies can influence the way we practice our own craft as academicians—namely, our core practices of research, reviewing, and teaching. This paper argues that the emergence of Web 2.0 tools provides an occasion for the IS discipline to critically evaluate our core practices in light of new technological capabilities to support collaboration.

This paper calls on the IS discipline to engage in two activities in relation to the developing capabilities of Web 2.0 tools. First, we invite the discipline to consider the current state of technological capabilities across the discipline and the disciplinary processes associated with those capabilities. We argue that the main processes that currently typify research, teaching, and reviewing were formulated during an era of paper-based exchange. Web 2.0 tools represent opportunities for people to collaborate and share knowledge in important new ways, and they may represent a major opportunity for our discipline. The capabilities of Web 2.0 tools can enable different processes, ones that could be substantially better. But even if new processes are better in principle, it does not guarantee they will be adopted in a way that actually produces improvements in practice. We suggest that the current capabilities of Web 2.0 tools provide an opportunity for an active, critical reflection on and debate over the benefits and limitations of our existing practices and the opportunities and threats provided by these tools.

Second, we call for the discipline to engage in a series of informative experiments regarding how we might adopt and use Web 2.0 capabilities to support research, reviewing, and teaching. Since adoption of these technologies cannot be divorced from the social practices associated with their usage, these small experiments may be necessary to identify, discover, and develop a menu of effective social practices for Web 2.0 tools. Technologies are often appropriated by users in unexpected ways, or not at all (DeSanctis and Poole 1994; Orlikowski 1992; Orlikowski and Iacono 2001). Existing academic practices are strongly entrenched in individual and institutional levels, and it will likely require a conscious effort to consider whether and how these practices should be reformed. We advocate a series of exploratory pilot projects designed to elicit greater information and insight into both the benefits and drawbacks of adopting Web 2.0 technologies for research, reviewing, and teaching. At the conclusion of these

experiments, the discipline would have better insight about whether (and how) to leverage these options and further develop these IT-enabled practices within the discipline—or to abandon these options in favor of existing practices or processes.

Although we believe that a variety of features and functions characteristic of Web 2.0 tools offer opportunities to transform our disciplinary practices, we forward the example of wikis for the purposes of this paper. We argue that wikis have key functionalities that make them uniquely suited for our disciplinary practices. We use our own experience with these tools to identify their possible benefits and drawbacks and to recommend experiments through which the discipline can explore and evaluate the potential implications of these tools.

Technological Assumptions

Drawn from the Hawaiian word meaning “quick,” a wiki is simply a website that anyone can edit. A number of wiki platforms are readily available—MediaWiki, SocialText, PBWiki, Wetpaint.com, to name a few—and each of these platforms embed a slightly different bundle of features to support collaboration. Regardless of these differences, wiki platforms typically support two essential functions: open editing and edit preservation. *Open editing* refers to the ability for anyone to easily edit the content on a wiki. *Edit preservation* refers to the ability of wikis to retain all edits to and versions of content contained on the wiki. Taken together, these two functionalities also allow users to “roll back” any changes to the wiki and restore content to a previous version. These two relatively simple capabilities of wikis, individually and in combination, can create a robust and transparent collaborative environment.

In this paper, we adopt an *ensemble view* of wiki technology. According to Orlikowski and Iacono (2001), this perspective focuses on “the dynamic interactions between people and technology—whether during construction, implementation, or use in organizations, or during the deployment of technology in society” (p. 126). Specifically, we assume that technology,

Embod[ies] social structures (conceptualized in terms of Giddens’ notion of structure as sets of rules and resources), which presumably have been built into the technology by designers during its development and which are then appropriated by users as they interact with the technology. Typical questions addressed by this literature include: How do users

appropriate the social structures embodied in a given technology and with what outcomes? What are the intended and unintended consequences of using a given technology? (Orlikowski and Iacono 2001, p. 127)

This perspective on technology suggests that certain social assumptions are embedded in technologies by their designers, but these features can be appropriated and enacted by users in various intended and unintended ways. Although wikis embody the key features of open editing and edit preservation, these features can be adopted by users in different ways to support very different types of collaboration.

For instance, although anyone can edit a wiki, not everyone does. Without effective social structures to create incentives and guide these collaborative activities, collaboration may happen in radically different ways from those that are intended, or not at all. Further, precisely how to define the “anyone” who may edit may differ between settings. The wiki administrator can choose different privacy settings to determine precisely who can view and edit content on the wiki. The administrator may choose to allow anyone with an Internet connection (i.e., anyone who is able), only registered users (i.e., anyone who chooses to identify themselves), or only invited users (i.e., anyone the administrator wants) to view or edit content on the wiki. Since the ability to view and edit content may be specified separately, these settings can be combined in different ways.

A wiki can also be appropriated in ways that can alter its ability to preserve the editorial history. Since many wikis require the users to manually save their work, some users may save their edits very frequently but others may save edits only after a long period of editorial revision. These practices can create considerably different editorial histories, making it easier or more difficult for editors to access the editorial history and/or collaborate simultaneously on a wiki document. The ensemble view of wiki technology we adopt here assumes that the outcomes of wiki technologies are a function of both the features of the technology and whether and how that technology is appropriated by groups that use it; neither can be divorced from the other.

Using Wikis as a Research Environment

One way for the IS community to leverage wiki technologies is as a *research environment*. Wikis provide a remarkable source of both quantitative and qualitative data through the

preservation of an electronic history of virtually all edits and activities that occur by its users, creating a unique environment through which to study IT-enabled collaboration. Wikis retain vast amounts of *quantitative* data, including the type and time of edits and the identity of the editor who made them. Since data is kept by the wiki in a standardized electronic format, it can be aggregated or disaggregated at a number of levels to provide a detailed picture of both the micro- and macro- collaborative processes. This data represents a fine-grained record of actual IS use, rather than the perceptual (Straub et al. 1995) or aggregate measures (Burton-Jones and Straub 2006) that the IS community has usually relied on to study this type of collaboration in the past. In addition, wikis also provide a rich source of *qualitative* data. Through information from discussion boards that operate in parallel with the collaborative editing and personalized information found on individual user pages, researchers can examine the discussion and rationale that supported particular collaborative features and decisions over time.

The combination of qualitative and quantitative data preserved by wikis provides a remarkably robust source of data about IT enabled collaboration that represents a promising frontier for IS research. It provides the opportunity to field test existing collaborative theories that were previously only addressable in experimental lab settings, such as roles of breadth and depth of discussion threads in the social construction of meaning for groups (Miranda and Saunders 2003). It provides a vast amount of textual data that could be analyzed through automated tools (e.g., Abbasi and Chen 2008) to develop and test theories of knowledge evolution (e.g., do articles go through particular stages in their development over time?) or of collaborative behavior (e.g., are certain topics or styles of discussions common in the development of high- or low-quality articles?). It could provide opportunities to apply existing theories of IT-enabled collaboration in new settings. For instance, previous IS research has explored the motivation of individuals contributing knowledge in online settings (Constant et al. 1996; Wasko and Faraj 2005), but these motivations may differ in open-source environments that occur outside any traditional organizational setting. These motivations may also differ for different kinds of content. For instance, in a separate study, we are finding that motivations for contributing to healthcare articles in Wikipedia differ considerably from motivations for contributing to other articles.

As the largest open-content wiki, Wikipedia provides rich, robust data on a phenomenon of keen interest to IS scholars, and the discipline should seek ways to actively explore opportunities represented by Wikipedia. We suspect that many IS

researchers are actively pursuing research portfolios using Wikipedia data, and we continue to do so ourselves. Our current experience with Wikipedia is derived from two separate studies: an in-depth case study of the article related to the Virginia Tech massacre (see Table 1) and a quantitative study of Featured Articles on Wikipedia (Kane 2008). Nevertheless, it will take considerable time for the lessons gleaned from studies like these to be disseminated through typical publication cycles at top journals. We hope to use this forum to disseminate some early lessons from this ongoing work to inform current and future research practices involving Wikipedia.

Most importantly, we found that Wikipedia hosts a remarkably rich and complex social environment (see Table 1 for details). The discussion pages of a Wikipedia article provide a fascinating account of how the conflicts, challenges, and decisions of the community influenced the article's development. Collaboration on Wikipedia is a much messier, more emotionally charged, and highly contentious process than is typically reflected in most accounts of online collaboration. The data preserved by Wikipedia provides a robust source for studying this social environment. The social structure can be gleaned from the article's edit history, and the personalities of the individuals involved are often revealed through their user pages. We expect that the success of Wikipedia as a collaborative environment is because of, not despite, this highly charged social environment—one that merits further investigation.

Because of this rich social environment, conducting research on Wikipedia involves equally complex ethical requirements. On one hand, all data on Wikipedia is available under GPL, and researchers can use this data without concerns about copyright or other intellectual property issues (Allen et al. 2006). Nevertheless, other ethical issues are at play. For instance, Wikipedia editors were extremely concerned about privacy and confidentiality, which was surprising since all activity on Wikipedia is public, open, and preserved. One respondent claimed that conflicts on Wikipedia had been known to escalate into real-world stalking incidents. Researchers must remain sensitive to the concerns of Wikipedians connecting activity on Wikipedia with their real-world identity (many were sensitive even to conducting e-mail exchanges). Wikipedians take their activity on Wikipedia very seriously, with some editors reporting spending nearly 40 hours per week editing Wikipedia articles. The IS discipline should consider it to be unethical to disrupt these collaborative processes on Wikipedia for the purposes of research (e.g., vandalize a page to observe how long it takes to get fixed).

Challenges Facing Wikipedia-Based Research

Although there are a number of benefits to Wikipedia-based research, it is not without its unique challenges. Researchers should not conduct a Wikipedia-based research agenda without considering many of the complexities and subtleties of the Wikipedia environment. First, collaboration on Wikipedia should not be reduced to its most easily observable elements. Since Wikipedia preserves rich data across over two million articles, it is tempting to limit an analysis of Wikipedia to this easily accessible quantitative data. This approach would overlook the rich and contentious discussions on the talk pages, the exchanges between editors posted on user pages, the diverse motivations for contributing to Wikipedia, and the debates between administrators regarding implementation of Wikipedia policy. If researchers restrict data collection to the most easily accessible quantitative data, there is a risk of developing a shallow, one-sided, and perhaps idealized view of collaboration on Wikipedia. Although we do not suggest that any individual study should be required to examine both qualitative and quantitative data, we do believe that the corpus of IS research into Wikipedia going forward should carefully balance both quantitative analysis and qualitative interpretation to more fully understand collaboration on Wikipedia.

Second, Wikipedia is an active social community and researchers should be aware that their actions are often transparent to its members. The researcher should take time to learn about and work within the cultural norms that govern collaboration on Wikipedia before conducting research. Unaware, we unintentionally violated several when conducting our research and were swiftly reprimanded for doing so. For instance, when attempting to administer a survey to the most prolific editors on the Virginia Tech article, certain administrators (not related to the article or our research) identified us as "spammers." Our account was blocked and it took considerable negotiation with multiple administrators to have the account restored and our research permitted to continue.² We found that the Wikipedia community was extremely supportive when we operated transparently and in good faith; but they resisted our efforts when we did not, even unintentionally.

Third, researchers should recognize that Wikipedia is a single case. Findings made using Wikipedia data should spur future research to assess its generalizability to other instances of IT-enabled collaboration.

²Interestingly, since there is no formal hierarchy within the administrator structure, restoring our account involved a process of negotiation involving several administrators, some of whom supported our position and others of whom did not.

Table 1. Data Collected and Used for Study of Wikipedia Article on Virginia Tech Massacre

Data	Description	Data Collected for VT Study	Summary of Key Findings
Version History	Collected complete versions of the article at distinct increments over time.	Collected complete version of the article hourly for first 100 hours, daily for next 10 days, and then tri-weekly for first 3 months. Placed into Excel spreadsheet for visualization and analysis.	Article demonstrated cycles of expansion and contraction as information was added and removed/synthesized/ spun-off. Some changes appeared (and disappeared) repeatedly as community wrestled for control of content.
Edit Log	Compiled data on each edit and the editor who made the edit, aggregating data to determine behavior and structure of collaborative community.	Analyzed total number of edits to the article (9,200), total editors (1,700), and their distribution over time. Examined average edits/editor, minor edits, anonymous edits, identity of and editorial profile of top 1%, 2%, and 10% of editors.	Community demonstrated core-periphery structure, core editors responsible for most of edits (top 1% = 20% of edits, top 10% = 50% of edits). An examination of the type of edits suggested that the core community primarily responsible for editing, not adding new content. This data was also used to determine impact of vandalism on the article, finding that acts of major vandalism were corrected in about one minute.
User Pages	Detailed the self-reported identity of each editor and his/her editorial history.	Created rough profile of the top 2% of editors, including biographical data on user pages and previous experience editing Wikipedia.	Surprising diversity in type of editors—college students, software programmers, and professional editors, to name a few. Both U.S. and international editors, both younger and older editors, wide range of breadth and depth of previous experience.
Talk Pages	Coded comments on talk pages to determine the editorial and administrative issues faced during article development.	Coded approximately 4,200 comments in 625 distinct discussion threads to determine issues facing the community during collaboration (91% IRR). Most common issues were what information to include and how to structure it.	Most significant issues addressed were what content should be added and what should be removed. Community became preoccupied with minor semantic issues and had difficulty resolving them (e.g., whether to call the article shooting or massacre involved 25% of the total comments posted). Surprisingly little attention given to community administration and organization.
Interviews	Submitted survey to top 2% of editors (n = 34), asking for insight of article and motivations for editing.	Asked how VT massacre article was similar to or different than other Wikipedia articles. Inquired as to how much time they spent editing Wikipedia and their motivation.	Most valuable and surprising of data collection methods, it revealed strong social and emotional motivations for contributing not previously revealed. Respondents indicated emotional, ideological, and psychological motivations for contributing (see below). Suggests a strong socio-emotional context of Wikipedia.

The social subtext of Wikipedia: Respondents revealed an assortment of motivations for contributing to the VT article:

- *Emotional.* Respondents reported wanting to “do something” to help rather than passively absorbing the information about the tragedy. A closer look at the most heavily edited articles on Wikipedia in the first half of 2007 showed an emphasis on death and/or tragedy (e.g., Anna Nicole Smith, Chris Benoit, Saddam Hussein, VT Massacre), suggesting that emotional factors may serve as an important motivator for why people contribute to Wikipedia.
- *Ideological.* Some respondents indicated editing to ensure that the article forwarded the appropriate message regarding gun control. The article demonstrated wild swings in the content of the gun control section as two camps of opposing editors struggled to define the gun control message of the article.
- *Psychological.* One respondent claimed that an extremely high number of Wikipedians had Aspergers’ syndrome, a form of autism. Although we cannot confirm this observation, virtual communities have been attractive to people on the autism spectrum (see http://www.henryjenkins.org/2007/03/my_main_question_to_jenkins.html).

Why study the Wikipedia Article on the Virginia Tech Massacre? (1) It experienced an unusually high volume of contribution and activity. With approximately 10,000 edits by 2,000 editors, it was one of the most heavily edited pages in Wikipedia history. (2) It was a heavily viewed article. It had the most traffic of any article in April 2007, and it was one of the most heavily viewed articles in Wikipedia history. (3) Editing took place over a very short time frame, controlling for confounding factors such as the increasing popularity of Wikipedia. (4) It was regarded both outside (e.g., *New York Times*) and inside Wikipedia as an exemplary article (nominated and selected first as “good article,” then as a “featured article.” Featured Article is the highest designation of quality for a Wikipedia article, shared by only 0.07% of all articles). (5) Despite these factors, respondents indicated that editorial was “typical,” albeit more time compressed than usual.

Table 2. Tips and Tools for Conducting Research on Wikipedia	
Tips for Conducting Research on Wikipedia	
•	Always complete your user page. Wikipedians will check up to see who you are. Provide a detailed profile about yourself and your research on your user page. This will give Wikipedians an understanding of your work and lead them to trust you more. Be prepared for critical comments and suggestions about how your work can be improved.
•	When soliciting survey respondents, list the survey questions on your user page and then provide a link to the survey question on the respondents' user page. Wikipedians dislike users posting a lot of dense text on their user page.
•	Prior to conducting a survey, solicit feedback at the Community Pump page. This is an area for general discussion among Wikipedians. Users here may offer suggestions for how to format your inquiry to be better received by the community. Community support gained here will aid in the positive reception of any request.
•	Don't allow research assistants to use your Wikipedia account. This practice is considered a violation of Wikipedia's rules and norms. The researcher should either post requests him/herself or have students post from their own identities. Remember, all activity is transparent on Wikipedia, and students may be questioned when posting.
•	Approach questions, concerns, and feedback with openness and understanding. Wikipedians are accustomed to editing content on Wikipedia, and your research will be no exception. In some ways, research on Wikipedia can feel like being submitted to a peer review process before ever beginning the research. Some feedback will actually be helpful.
•	Wikipedians will generally be very hesitant to interact outside of the online environment. Some will even hesitate to interact via e-mail. This results from anecdotal stories of Wikipedia conflicts resulting in, according to one respondent "real world stalking incidents." Respect and guarantee of privacy is essential to build trust with Wikipedians.
Types of Helpful Tools Publicly Available for Research	
•	http://vs.aka-online.de/wppagehiststa . Tool that returns the total number of edits on a given Wikipedia article, number of edits by month, percentage of anonymous edits, and percentage of minor edits. Tool validated against VT data.
•	http://tools.wikimedia.de/~interiot/cgi-bin/Tool1/wannabe_kate . Tool that returns the total number of edits made by a particular user, the total number of unique pages edited, and the most heavily edited page by a given user. This tool was validated anecdotally against user interviews.
•	http://wikiscanner.virgil.gr/ . Tool that identifies the IP address (anonymous editors only) of edits made to particular Wikipedia pages. Tool not validated.
•	http://stats.grok.se/ . Tool that tracks the Internet traffic for a given Wikipedia article. Tool not validated, but maintained by a member of the Wikimedia Foundation board.

Proposal: Develop an ongoing community resource of guidelines and tools for conducting Wikipedia-based research. We have included some lessons we learned and resources we used in the process of researching Wikipedia above and in Table 2.

Some of these lessons may be regarded as the beginning of a series of "best practices" by which to conduct responsible and ethical IS research. Others will identify, develop, and share publicly available tools that have been found and validated for conducting Wikipedia research. We hope that others will use this list as a starting point to develop a robust collective research stream that uses Wikipedia as a research setting for studying electronic collaboration. We view Wikipedia as a remarkable and open platform for studying electronic collaboration, and we think that the IS community should aggressively cultivate an active research agenda in this area. It is highly likely that other fields and disciplines will gravitate

toward Wikipedia for the same reasons. An early and intentional effort on behalf of the IS discipline will allow us greater influence over setting the agenda and standards for this research stream. We hope this paper will generate a series of guidelines for IS researchers, editors, and reviewers for conducting and evaluating Wikipedia research. We also hope it will disseminate lessons and insights into Wikipedia-based research and shorten the cycle by which this knowledge can reach the IS community.

Using Wikis for Peer Review and Publication

The second opportunity for wikis to impact the IS discipline is to embed wiki-based collaboration in peer review and publication practices. Existing peer review processes were

established at a time when it was necessary to exchange physical documents through the mail. Yet, as the process has received increasing automated support (culminating with packaged solutions like Manuscript Central), the structure of the process itself has remain unchanged. Electronic storage has replaced physical files, and electronic distribution has replaced physical mail. Although the process is perhaps accelerated as a result of these advances, the same cast of characters performs the same roles in the same way. In this respect, it would seem we are “paving the cow paths” in how we have used IT in this process so far.

If there were universal satisfaction with the existing review processes, then it would be fine to keep on paving those cow paths—but there is not. Satisfaction with the quality and timeliness of the review process varies widely across the IS discipline and among many constituent actors. Authors often voice complaints about the number and length of review cycles required to reach a final decision on a paper at top IS journals. Reviewers are often overworked, needing to formulate an independent recommendation on a paper but also provide constructive feedback without knowing what the editor’s ultimate decision will be. Editors must assemble often disparate reviewer opinions into a singular decision letter (and recommended revision strategy) without knowing whether the recommended strategy will satisfy all of the reviewers and whether this guidance might even create unforeseen problems. Authors’ perceptions that the review process may be somewhat arbitrary may lead them to shop a manuscript from journal to journal, with too little effort made to incorporate the suggestions from previous review teams. Further magnifying these challenges are the rapid increase in submissions in recent years to top journals, such as *MIS Quarterly* and *Information Systems Research*. We worry about the potential for a dysfunctional feedback loop at the top IS journals, where increasingly overworked review teams perform less effective reviews, leading to more rounds of review and more manuscript shopping, resulting in ever greater demands on editors and reviewers.

Despite these challenges, however, our top journals continue to produce outstanding examples of high-quality research. This commitment to quality cannot be compromised and should not be sacrificed. Nevertheless, it may be worth considering whether it is possible to develop alternative reviewing processes that would achieve equal or better quality outputs while making better use of the time, energy, and commitment of reviewers, editors, and authors. We believe the traditional review process is hampered by three factors: a linear, “waterfall” approach to completing review tasks, excessive compartmentalization of communication between different actors, and a general lack of transparency in the

process as a whole. A wiki-based review platform holds considerable promise for improvement by enabling alternatives to the current linear, highly compartmentalized, and opaque process. While it is beyond the scope of this commentary to architect a detailed wiki-enabled review process from start to finish, we will offer some initial thoughts on how use of wikis could improve the quality of the review process, and also reduce the time required to move a paper through the entire review process. Further, with the support of the senior editor, we used this paper as a first experiment in wiki-based reviewing and we have included a brief description of and specific lessons learned from this process in Table 3.

Our major suggestion is to use wikis to introduce periods of interactivity among members of the review team for papers that are likely to receive a “revise and resubmit” decision. Wikis could enable interactivity while also preserving the anonymity of the reviewers and authors to everyone but the editor(s). Specifically, we advocate two periods of wiki-enabled dialogue in the current review process. The first dialogue would occur among the reviewers and would be initiated by the editor in the case of a likely revise and resubmit decision. Reviewers would be invited to read and comment on the other reports. Reviewers could also revise their own reports as appropriate based on the comments of other reviewers. The editor(s) would monitor the process and would facilitate discussion as needed (e.g., to seek clarification from reviewers), but it but would probably be wise to not offer opinions at this stage.

Once the period of collaboration between reviewers is completed and the editorial decision is formulated, we suggest a second period of open dialogue between authors and the review team. The entire review package would be posted as wiki pages and then authors would be invited to engage in a constructive dialogue with the review team. Authors could use this opportunity to seek clarification on criticisms of the manuscript or recommended remedies, to argue for the validity of what they have done, or to seek feedback on candidate revision strategies. At the end of this dialogue, the editors might choose to adjust the guidance contained in their official reports, or not, as the circumstances warrant.

We believe that these two periods of interaction between members of the review team could yield a number of benefits. First, allowing reviewers to respond to one another’s comments provides the editor with more information from which to formulate an appropriate decision. If members of the review team agree with the comments made by a particular reviewer, these points of consensus could be highlighted. On the other hand, if other members of the review team disagree with the comments made by a fellow reviewer,

Table 3. A First Experiment in Wiki-Based Review

In consultation with the editor-in-chief, we decided to employ an experimental wiki-based review process for this paper. This process provided some important initial insights into the potential benefits and drawbacks of wiki-based review.

We embedded the standard MISQ review forms into a wiki workspace (on a SocialText wiki to which we had access). Reviewers, authors, and editors were anonymized by title (e.g., Reviewer 1, Author 1, Senior Editor), and only the senior editor could access the identities. Reviewers posted their comments on the paper and then had the opportunity to comment on one another's reviews. Authors then posted their reply to the comments to the wiki, and the review panel had the opportunity to read and respond to this document. The wiki used for the review process is available at www.socialtext.net/misq5040.

Although it is difficult to generalize from a single case (particularly in the unique setting of an Issues and Opinions submission), some initial insights are possible.

- There are a number of startup costs associated with new processes, both expected and unexpected. Some of these startup costs are technological (e.g., figuring out how to anonymize the wiki), but most are social in nature. For instance, the editor noted that the wiki could automatically notify users by email when new comments were made to the wiki, but review panelists were not conditioned to respond to these announcements.
- The period of interaction revealed critical information that would not have been revealed in the traditional review process. The two reviewers disagreed with one another on the current state of the review process at top IS journals (i.e., whether it was in need of major repair or not), but this difference was only identified when one reviewer replied to the comments of the other. The authors found this information indispensable for crafting an effective revision strategy, enabling them to find a common ground between the reviewers' opinions.
- One reviewer commented on the need to "reload" the paper in his/her memory for the period of interaction, an unintended consequence of the process change. As a result, this reviewer noted that, for wiki-based process innovation to work, it would have to occur within strict deadlines and not when reviewers had spare time (as in the current system). If reviewers did not comment by the deadline, the review process would continue without their feedback. This reviewer noted that these changes could introduce interesting dynamics into the review process.
- A more radical suggestion was also formulated by one reviewer: allowing the review panel to directly edit the paper, rather than craft a separate reply document. Since wikis allow the preservation, restoration, and comparison of multiple versions of the content, little damage would be done by allowing this process. We envision the value here would be in the ability to comment directly on the document, permitting discussion alongside the relevant text rather than separate from it. Some wiki platforms currently support this functionality but some do not.
- The particular wiki platform used had strengths and weaknesses for the review process, which differed from our use of the same wiki platform in the classroom. It would be important to carefully select the appropriate wiki platform for use in the wiki process for best results.

the other reviewers could indicate their dissent on these matters. Further discussion may help lead to consensus among the review panel on some disputed issue (e.g., the original reviewer may withdraw or clarify the objection) or it might become clear that the panel has reached a fundamental difference of opinion on a particular matter. The editor might weigh in to resolve the issue, might invite the authors into a discussion of the issue during the second period of interaction, and/or might decide that this point of disagreement is likely significant enough to derail the review process and issue a rejection (rather than discovering these problems only after multiple additional rounds of review). Authors could engage in a similar dialogue with the editor and/or reviewers before determining whether or how to proceed with a revision

strategy. We believe that the primary benefit of these periods of interaction is to provide more information earlier in the review process to determine whether and how to proceed with further rounds of review.

Second, the period of open dialogue could leverage reviewers' time more efficiently by separating the evaluative and developmental portions of the review process. The purpose of reviews at most top journals is twofold: to identify a paper's potential suitability for publication and to offer insight on how the paper might be improved. Currently, these processes are conducted in the same review document, which may not be most efficient or effective way to accomplish these dual objectives. If a paper is to receive a reject deci-

sion, it may be sufficient for the reviewer to broadly illuminate the three or four points that could most improve the paper. The authors would receive valuable feedback and the reviewers would not spend time identifying minor comments that will likely be subsumed in major revisions to the paper. On the other hand, if the paper is to receive a revise-and-resubmit decision, reviewers may want to develop more detailed feedback to guide the process, which could be accomplished in the period of interaction. Thus, the period of interactivity in the review process could enable reviewers to provide feedback that is more appropriate given the likely editorial decision: rejected papers will receive briefer but higher-level feedback, whereas papers invited for revision will receive more attention.

Third, interactivity in the review process enables editors to leverage the inherently social nature of the review process to improve the review process as a whole. Reviewers may identify and articulate the issues facing a paper more carefully if they know they may be called to defend their positions to their peers in front of an editor who knows the identity of all players. It may also serve to improve the craft of reviewing over time. In the current system, a reviewer's window into whether they have performed a good review or not comes from being copied on a review package that often arrives (if it does at all) weeks or months after completing their review. A revised wiki-based system would provide this feedback as a natural part of the interactive process. Reviewers will receive more immediate and interactive responses to their comments, making it easier to make inferences about their quality and providing the opportunity to clarify or restate certain arguments. As reviewers receive this enhanced feedback on the quality of their reviews, they can learn from the process and improve the quality of their reviewing in later rounds of the same paper or in their reviewing of other papers.

Wikis and other Web 2.0 tools could also represent a complementary publication channel for distributing articles, enhancing of standard journal websites to allow community "review" of the paper following publication. The advantage is that it could provide a common forum for discussing the merits and implications of papers following their release, increasing dialogue among the discipline. For instance, as Ph.D. students discuss particular articles in seminars, they could post their deliberations online, enhancing the experience of future readers. On the other hand, these feedback mechanisms may devolve into an outlet for detractors of a particular paper or method, attracting only those who seek to discredit a paper rather than discuss it. Wiki-based paper dissemination might be more valuable for certain types of papers (e.g., Issues and Opinions, Theory and Review) than others (e.g., empirical studies).

Challenges Facing Wiki-Based Review

The benefits of a wiki-based review process would not be automatically realized simply by adopting a wiki platform. It involves a fundamental change to core disciplinary practices that have been ingrained for decades or more, and such changes create some potentially significant challenges.

First, successful implementation of wiki-based review would require energy and effort by all stakeholders in the review process. Journal editors would need to develop and implement new processes, possibly requiring several rounds of experimentation to identify how best to promote quality reviews. Reviewers would need to learn what is expected of them in the new review process, which would certainly create more work in the beginning for already overburdened reviewers. Authors would face additional burdens too, as they submit their work to new processes involving increased interaction with reviewers and editors. This energy and effort would be required by all stakeholders without clear guarantees about whether or how these efforts would improve the review process for the future. Further, no new processes will change the fact that reviewing is simply one responsibility among many for academics, one for which we receive little direct reward. Therefore, editors, reviewers, and authors may be understandably reluctant to expend the effort required to learn a wiki-based review process, but it would require the active involvement of all three stakeholders for any changes to be successful.

Second, although we have assumed that interaction between reviewers will have a net positive impact on the review process, this benefit is by no means guaranteed. It is certainly possible for dysfunctional group dynamics to contaminate the interactive process. For instance, reviewers might reach an irresolvable impasse on a particular issue, requiring that the editor step in and make an immediate ruling to return the review process to a constructive course. It may become necessary to adopt more formal group processes, such as nominal group technique (Delbecq et al. 1975), to help facilitate these interactive portions of the review process and aid in creating productive collaboration. We do not think independence of reviewers requires isolation, but this potential implication would need to be carefully evaluated and monitored.

Third, using a wiki could introduce unforeseen changes to the review process, with unknown implications. For instance, because reviewers know that the period of interactivity is available, this awareness might lead to briefer initial reviews, since reviewers might assume they will have the chance to flesh them out later. Or, it might lead to longer reviewers, if

reviewers were to feel greater pressure to “cover all their bases.” Either way, this would involve some tradeoffs that may not be positive on net.

Fourth, although the interactivity may decrease the workload of the review team by eliminating one or more full rounds of review, these gains may be offset by the coordination costs required by reviewers to interact with one another within each round. While at present reviews can be completed when most convenient over a four to six week period, in the new process the interactive portions would have to be scheduled to in a much tighter window lest the overall process be unacceptably delayed.

Clearly, there are a number of significant challenges and risks associated with adopting wiki-based review. On the other hand, high risks often introduce the possibility of high rewards. It could result in a reviewing process that increases the volume and quality of published research while reducing the time and energy required doing so. If such a goal could be realized, it would certainly be worth considerable effort and energy on behalf of the discipline to achieve. Further, if the IS discipline can successfully reform academic review processes, these processes might be adopted by other academic disciplines and improve our standing within the academy.

There are also risks associated with failing to consider the impact of wikis and other Web 2.0 tools on our academic review processes. Electronic review systems (e.g., Manuscript Central) are codifying existing practices into IT systems without considering whether these are the best way to conduct these processes. Even now, if a journal did decide to implement wiki-based review processes, it would likely be necessary to introduce a separate system into the process to manage the interactive elements of the process until a time when an existing software package supported both elements. Other disciplines are also considering similar implications of Web 2.0 on the peer review process (Anderson 2006). Without even considering the question of whether or not the IS discipline should abdicate the lead in these process innovations, disciplines with faster publication cycles could address emerging and interesting IS-related research questions earlier, relegating our findings to “old news” by the time our research reaches publication.

Proposal: Sponsor a special issue of a top journal that employs Wiki-based review. Given the high risk/reward profile of significant changes to existing review processes, we recognize that editors, reviewers, or authors would be rightfully wary to adopt any of these suggestions without a better understanding of how these innovations would influence the review process and its outcomes. The pros and cons of wiki-

based review are not likely to be fully realized through process design alone, but it requires experimentation and reflection. A relatively low-risk approach to accomplish these goals would be a special issue dedicated to experiment with and evaluate wiki-based review processes that would allow a group of editors, authors, and reviewers to explore the benefits and drawbacks for the changes introduced here. This approach would provide an opportunity to explore the potential benefits of wiki-based review, while minimizing the downsides and involving only parties who were interested in participating in such an experiment.

Such a special issue could take one of two distinct forms. First, it could be a much-needed special issue dedicated to IS research involving Web 2.0 technologies, which then uses Web 2.0 technologies in the development of the issue. The benefit of this approach is a cognitive alignment between the issue’s content and its process. Second, the issue could be simply a process-based special issue, soliciting general (previously unsubmitted) articles. The advantage of this approach would be that the issue could assess the benefits on a number of different types of papers, and the authors of all papers submitted are willing to accept both the potential advantages and disadvantages of an experimental review process. In either approach, the senior editors could then detail the benefits, drawbacks, and potential future directions of wiki-based review, publishing their results for the community as a summary article for the issue.

Using Wikis for Teaching

Another potential impact of Web 2.0 is in the classroom. Despite advances in collaborative technologies and the abundance of freely available information on the Web, most faculty continue to teach using traditional methods based on textbooks and coursepacks. Although these traditional methods have a number of benefits—clearly organized content assembled by recognized experts—these traditional practices also have a number of widely recognized drawbacks. The price of business textbooks has grown almost prohibitively high, and copyrighted content for coursepacks is not cheap. Even the newest textbooks can be outdated before the latest edition is available on shelves. Further, textbooks, even at a reasonable price and with good content, are unmodular and rigid, not amenable for adaptation by the professor to the unique learning needs of the individual setting. Some publishers allow instructors to pick and choose the best content from books and other traditional materials and compile it into a custom book—but this does not make the material any timelier. We argue that wikis can be used to

create content that could be substantially less expensive, timelier, more flexible and, and, in some instances, even more accurate than traditional textbooks.

Although there are many ways that wikis can be used to facilitate classroom learning, the most significant impact is likely in the ways that wikis can be used to create and/or harness course content. First, faculty members could increase their utilization of freely available content generated by open-source knowledge creation communities. Although the Wikimedia Foundation has attempted to create Wikiversity as a repository for curriculum, Wikipedia still appears to be the more robust source of content. Similarly, the IS community might develop our own expert-created open-source content, similar to the model presented by the Global Text Project at the University of Georgia and University of Denver (www.globaltext.org). This approach solves the problem of amateur or turbulent content, but it becomes subject to greater lag times as faculty must find time in their already busy publication streams, and it faces the same critical mass problem of Wikiversity. Studies have demonstrated the generally reliable nature of community-generated knowledge and have generally shown that the larger the community generating the knowledge, the more accurate and complete that knowledge is likely to be (Ball 2007; Kittur and Kraut 2008; Wilkinson and Huberman 2007). As a result, we expect that Wikipedia will likely be the most robust source of community-created content.

Second, rather than appealing to an outside community for content, wiki platforms can also give the student “crowd” the opportunity to contribute content for class. Many companies are experimenting with Web 2.0 based methods in which they leverage the contributions of volunteers, customers, or collaborators to tackle problems they have found it difficult to address in house (Friedman 2005; Howe 2006; Li and Bernoff 2008; Tapscott and Williams 2006). In similar ways, faculty can use these tools to spur students to actively participate in the development of their own curriculum, feedback, and learning goals. Students are well positioned to identify relevant content on forums frequented by students but not by faculty—for instance, YouTube, Facebook, or student newspapers. Encouraging students to contribute course content from these sources also serves as a valuable learning mechanism, identifies content that may be more relevant to the student population than those selected by faculty, and creates an engaging dialogue as students present their findings and justification for its inclusion on the wiki. Copyright infringement and plagiarism are important considerations when adopting student-contributed content and faculty must take the opportunity to develop specific ethical guidelines for acceptable contribution and citation in a Web 2.0 environ-

ment. Nevertheless, we view this issue less as a threat and more as a much needed opportunity to begin shaping ethically responsible use of Web 2.0 tools in knowledge creation.

Course deliverables can be designed to facilitate content creation. For instance, group projects in our classes are not traditional papers but students are assigned to develop sections of the class wiki. The knowledge creation that occurs in one class is preserved for use by future classes. Nevertheless, high-quality knowledge is difficult to create, even in strong communities. In our experience, only about 10 percent of initial contributions are of sufficient quality for use in later classes, but the 10 percent that is reusable would not have been found by the professor otherwise. Assignments can, however, be structured in a way to increase the quality of the content. One way is to build on course content across sections or in different semesters. For group projects, our students are permitted to either develop new content or improve on existing content from previous semesters. Since it is easy to compare different versions of a wiki page, students can easily be evaluated on their incremental contribution to a particular article rather than a freestanding product. Active guidance from the professor and peer review among students during project development can also help improve content. Since wikis represent evolving content rather than a static product, the professor and other students can offer incremental feedback and evaluation at multiple checkpoints of the project. Since all wiki projects are public, the professor can also highlight best practices from current or previous semesters to provide templates for good work that other students can emulate. These practices need not markedly increase the workload of the professor, but can shift the effort from project completion to throughout the project development.

Third, faculty members could use other Web 2.0 tools to harness and organize the abundance of information freely available on the Web. Wikis can be used to create “mashups” (i.e., combinations of content or features of multiple Web 2.0 technologies in a single place) to leverage the best existing content on the Web. Wikis can use other Web 2.0 tools to gather and categorize freely available information for use in the classroom. These tools can be used to identify relevant content and route it to the appropriate place on the course wiki through RSS feeds and associated filters. For example, we use an RSS feed reader to tag certain articles from the press and route those articles to the appropriate sections on the course wiki. This provides more timely and robust information on class-related topics than would be possible through other mechanisms.

Web 2.0 tools themselves will not improve teaching or learning, but it is possible that the processes they enable will.

As a result, choosing whether and how to adopt Web 2.0 tools in the classroom should not be made for the sake of using new tools. The teacher should carefully consider whether and how these tools can increase the value of and/or decrease the effort required to manage the learning environment. Admittedly, it may take some trial and error on behalf of faculty to develop effective teaching processes that leverage Web 2.0 tools. We regard these efforts as the cost of remaining relevant in a world being changed by information technology, a common experience of many knowledge professionals today. Table 4 briefly describes several ways we have experimented with wikis to change our own classroom practices at both the undergraduate and the MBA levels.

Many managers are also experiencing similar sorts of changes in authority and role in contemporary organizations (Hamel and Breen 2007). Increasing the involvement of students in developing and evaluating course content may also have implications for the faculty member's role in the classroom. In one sense, faculty members will do much of the same things we have always done: assign readings, hold lectures, lead discussions, assign and evaluate projects or exams, etc. On the other hand, we may conduct these tasks in ways that capitalize on the collaborative environment of Web 2.0 tools: students evaluating the value of readings we assign, faculty providing opportunities for responding to or participating in lectures, enabling discussions outside the formal classroom, incorporating peer evaluation into assignment development and project evaluation. Thus, we see faculty members shifting their emphasis between the traditional roles of "resident expert" and "qualified guide" to less of the former and more of the latter. This shift should not be confused with a reduced importance of the faculty member; it is unlikely that effective collaborative learning will "just happen" without the active presence and guiding hand of the faculty member.

Challenges Facing the Use of Wiki-Based Content for Teaching

There are several potential drawbacks to adopting community-generated content for classes. First, although wikis may be able to harness better knowledge for use in class, their use does introduce the possibility of variance in the consistency of that content. Sources such as Wikipedia are surprisingly up-to-date, but these same dynamics also mean that that content may be somewhat fluid (e.g., an article may change between the time it is assigned and used in class). Second, although we recognize the community good of creating such a free common knowledge source within the IS community, we expect that, without strong incentives for faculty to contribute their best work in a timely fashion, it will be difficult to

continue generating content once initial enthusiasm for these initiatives wear off. Hiring, promotion, and tenure decisions are typically based on research productivity, not on developing content for an open-source knowledge repository. Any knowledge sharing regarding teaching practices will be most effective if they happen automatically as a by-product of creating content for their own teaching efforts. Third, content gleaned from existing wikis and other Web 2.0 sources may be targeted to an audience other than that of an academic class (e.g., stories designed to sell magazines may or may not be well-suited for academic discussion). As students are harnessed to create content for the course, this content may vary considerably in quality or may not be appropriate for class use. Finally, students have a tendency to believe that all information online is true, accurate, and available. The faculty must take the opportunity to teach students how to be effective consumers of peer-developed content when using this content for courses.

Proposal: Develop and sustain an IS WikiProject and Portal on Wikipedia. We recognize that IS faculty might be reluctant to adopt content for courses whose quality may vary from article to article or from day to day. We argue that active IS community involvement in forums like Wikipedia could identify the best content, exert a stabilizing influence over that content, and proactively develop content that would be of use in the classroom. A good mechanism to achieve these goals would be to develop and sustain a WikiProject and Portal dedicated to IS on Wikipedia. As Wikipedia defines these initiatives,

A **WikiProject** is a collection of pages devoted to the management of a specific topic or family of topics within Wikipedia; and, simultaneously, a group of editors that use said pages to collaborate on encyclopedic work. It is not a place to write encyclopedia articles directly, but a resource to help coordinate and organize article writing and editing.³

Portals are pages intended to serve as "Main Pages" for specific topics or areas. Portals may be associated with one or more WikiProjects; unlike WikiProjects, however, they are meant for both readers and editors of Wikipedia, and should promote content and encourage contribution.⁴

Currently, Wikipedia does not have either a WikiProject or a Portal dedicated to IS.

³<http://en.wikipedia.org/wiki/Wikipedia:WikiProject>.

⁴<http://en.wikipedia.org/wiki/Wikipedia:Portal>.

Table 4. Innovations Enabled by Wiki Use for Teaching

	Description	Supporting Processes	Outcome
Crowdsourcing Exams	Students are permitted to post suggested questions <i>and</i> answers for final exam using an overall classification structure provided by the professor.	No guarantee is made regarding validity of information, teaching students that all online content is not valuable or true. Students awarded bonus points on the exam if question used.	In a class of 140 students, over 200 questions/answers submitted—a 10:1 ratio of submissions to question used. Students report that the exam is difficult but fair.
Peer Review	Students are required to review two group projects, detailing its strengths and potential improvements.	Groups may nominate the “best” peer reviewer as a candidate for bonus points. Every member of a project group reviews different projects, providing a complete overview of other projects.	Although groups improve based on the content of the feedback, the impact is mostly motivational. As groups observe the quality of other projects, they tend to raise the quality of their submission to compete with others.
Dynamic Content	RSS feeds provide relevant articles from the business press to the wiki in both general and targeted formats.	The professor uses Google Reader to aggregate feeds and tag interesting articles to send to the wiki. Students are required to post and reflect on at least two articles to the wiki throughout semester.	Even if used only as headlines, gives a sense of recent developments in technologies and technology companies, keeping class content fresh. Students become accustomed to using RSS as a means to stay informed on a topic.
Multimedia Deliverables	All course projects are submitted only as wiki posts. This enables students to employ pictures and videos as a part of their presentation and link to source articles.	Videos are used as part of course lectures and wiki-based reading materials, many of which had been submitted by students in previous semesters, setting expectations for appropriate use.	Content becomes more interactive and user-friendly. Since all deliverables are posted to the wiki, deliverables are easily reused as content for future classes.
User Profiles	Students develop brief profiles about themselves (including a picture).	Profiles are created as part of an exercise designed to teach students how to use the wiki.	Enables professor and students to identify one another in larger classes and connect online activity with real-world identity. Can be used as an informal social networking mechanism (particularly when augmented by a pure social networking tool like Facebook).
Quantifiable Participation Metrics	All wiki activity is tracked, including page views and posts.	Students are informed that wiki participation will count towards class grade.	Most active wiki contributors often not those most vocal in class. Also serves as a means of validating excuses for late or improper work because all wiki activity is recorded.
Self-Organizing Systems	Students are typically provided instructions for how to organize contributed content or register topics.	Brief instructions are provided for how to organize content on each wiki page (e.g., put your name in class by alphabetical order).	Decreases administrative workload of professor by developing processes by which students organize and administer content.

There would be a number of advantages to developing such a forum on Wikipedia. First, it allows the IS community to develop a repository of free and open-source knowledge for use in the classroom without having to create one from scratch. Relevant articles within related WikiProjects (e.g., Computer Science, Information Science, Technology, Telecommunications) or on Wikipedia in general could be used to assemble and organize a critical mass of content (articles may belong to multiple WikiProjects). An IS Portal associated with the WikiProject would also provide a single destination by which IS faculty could find relevant free and open-source content for classes. Second, an IS WikiProject would provide a forum for evaluating the quality and appropriateness of Wikipedia articles for use in the classroom. Each WikiProject is permitted to evaluate quality (1 to 6 scale) and importance (1 to 4 scale) of articles as they relate to their own scope of interest. This process would begin to identify the best information available on Wikipedia for use in IS education. Third, this systematized approach would allow the IS community to identify which information should be added to or improved on Wikipedia. Many WikiProjects support initiatives like a community “to do” list and a “collaboration of the week,” where one article is the focus of the development activity. Deliverables for IS courses could also be targeted at developing or improving content for the IS WikiProject. Fourth, a robust IS portal on Wikipedia, one of the top 10 most heavily trafficked sites on the Internet, can help raise the profile of IS in general.

Wikis as a Collaborative Platform

Whether for research, reviewing, or teaching, the single most valuable advantage to wiki platforms is the increased ability for members of the IS community to work together on our core processes. Table 5 presents a summary of the ways we believe wikis can influence the core process of research, reviewing, and teaching.

Researchers collaborating on a project can use wikis as a common repository of data or documents. Authors can use wikis to collaboratively edit papers, as a way to work on a paper simultaneously and/or to reduce version control problems. Different conferences or journals may choose to experiment with wiki-based review or presentation, such as the one that occurred during a panel session at ICIS 2007 (Te'eni et al. 2007), each discovering different benefits and drawbacks associated with these process innovations. Teachers may find or develop outstanding sources of Web-based content for their own courses that could be readily adapted by colleagues in other courses or at other universities. IS academics may find numerous other benefits for a robust platform for creating and

sharing knowledge within the discipline that go beyond what can be accomplished with mailing lists and webmaster-controlled web sites.

We recognize that many individuals in the IS community are initiating pioneering efforts in these and other areas. Our experience suggests that IS academics are open to and interested in the potential process innovations that wikis enable. One of the biggest challenges hindering these developments, however, is the lack of a common platform on which these processes can emerge. Different individuals and different universities often employ different platforms for wiki-based collaboration. These multiple platforms mean that information created on one platform and user proficiencies gained in one wiki environment are not easily transferable to another. The potential improvement in collaborative processes we outline here, however, is likely to be realized only once a standardized wiki platform emerges. We suggest that for the discipline to truly leverage potential benefits of wiki-based collaboration, the discipline needs a common platform on which all IS academics can collaborate on research, teaching, and peer review.

Proposal: AIS develop or (preferably) adopt a common wiki platform for use by the IS community. The IS community maintains a common knowledge repository, the ISWorld website. This website is complemented by a single e-mail distribution list that disseminates mostly general information regarding conferences and journals. As an important addition to these resources, we recommend that AIS should develop, support, and maintain a common wiki platform available for all its members. The technological and financial demands of such an initiative are likely to be fairly reasonable. Wikimedia became one of the top-ten sites on the Internet with only seven paid employees.

The most significant short-term benefit to a common wiki platform in the IS discipline may not lie in its ability to create new Wikipedia-like collaborative opportunities, but in its ability to streamline and leverage existing collaborative efforts by members of the discipline. For instance, a wiki platform may be more appropriate for existing communication. The current ISWorld distribution list announces job postings, special issues of journals, various regional conferences, and debates side-by-side on one common forum. A wiki could host multiple discussion boards and communities (e.g., conferences in a particular geographic area, information regarding specific journals, discussions around specific subjects or methods) that enable users to voluntarily select which discussions they participate in or receive updates about by e-mail or RSS feed, as opposed to a single generic listserv.

Table 5. Summary of Potential Benefits and Drawbacks of Wiki-Enabled Processes

	Research Environment	Peer Review & Publication	Teaching	Collaborative Platform
Overall Potential benefit	<p>Wikipedia represents a rich source of collaborative data traditionally difficult to find.</p> <ul style="list-style-type: none"> • Interactions automatically preserved for qualitative and quantitative analysis. • Over 10 million articles provide abundant primary data on IT-enabled collaboration— not self-reported or perceptual. • Multiple languages enable multi-cultural comparisons. • Open-source license (GPL) means data freely usable. • Publicly available tools to facilitate analysis. 	<p>Wiki-based interaction can improve efficiency and quality of review process.</p> <ul style="list-style-type: none"> • Interactive opportunities for review team to identify points of consensus, contention, or needed clarification in review. • Provides editor with additional information to make decisions and offer guidance. • Opportunity for authors to clarify potential revision strategy before proceeding. • Increased social pressure to perform good reviews. • Reduce number of rounds of review to reach a sound decision. 	<p>Open-source or community created knowledge for teaching lowers price and increases flexibility of content.</p> <ul style="list-style-type: none"> • Crowdsourcing course content and deliverables potentially decreases costs for students and increases timeliness of content. • Peer production enables students to identify nontraditional sources of content (e.g., YouTube, blog posts) that may illuminate course concepts in novel and relevant ways. • Supports epistemological position more consistent with Web 2.0 world, enabling students to learn in ways more appropriate for contemporary environment. 	<p>Common wiki-based platforms enable researchers to collaborate more productively on all processes.</p> <ul style="list-style-type: none"> • Serves as repository for project data. • Opportunity for simultaneous authoring of paper. • Common platform reduces startup costs and increases learning opportunities in review process. • Easier for faculty to exchange teaching materials. • Multiple wiki pages, to which users can subscribe for updates, enables finer-grained dissemination of information than does a single IS World distribution list.
Potential drawbacks	<ul style="list-style-type: none"> • One-dimensional analysis of most easily accessible data (e.g., quantitative) can limit generalizability or bias findings. • Researchers' actions are transparent to community. • Decentralized administrative structure means no single set of rules to follow during research. • Dynamic community, standards may change over time. 	<ul style="list-style-type: none"> • Potentially more/different work by reviewers (including start-up costs). • Potentially lower quality initial reviews in anticipation of period of interaction. • May lessen independence of reviewers. • Unforeseen risks of implementing changes in one of most critical disciplinary processes. 	<ul style="list-style-type: none"> • Content may be less consistent as constant edits are made. • Faculty workload can increase markedly if wikis is used to enable students to generate content but not help evaluate that content. 	<ul style="list-style-type: none"> • Necessary to choose single platform that supports diverse functions (teaching, review, research). • May be difficult to come to consensus regarding most appropriate wiki platform for diverse needs.
Challenges to appropriation	<ul style="list-style-type: none"> • Wikipedia culture suspicious of "experts" and outsiders. • Unique organizational and social environment raises questions of generalizability to other settings. 	<ul style="list-style-type: none"> • Ingrained cultural factors of existing review process. • No interface with existing electronic review systems. • Current over-working of review team means there are few slack resources for innovation. 	<ul style="list-style-type: none"> • Changing role of faculty from expert to experienced guide. • How to leverage content from other Web 2.0 tools? 	<ul style="list-style-type: none"> • Different wiki platforms embed different assumptions and functions, tough to work with many.
Recommended first step	<p>Assemble best practices for tools and ethical standards for approaches to conducting Wikipedia research.</p>	<p>Special Issue of top IS journal dedicated to experimenting with Wiki-based review.</p>	<p>Develop/maintain an IS WikiProject and Portal on Wikipedia to identify, evaluate, and contribute to relevant articles.</p>	<p>AIS to develop or adopt common wiki platform for discipline.</p>

Further, the existing general listserv digest could be made more navigable by placing embedded links to announcements posted on the common wiki platform rather than embedding the full text of announcements. We suspect that one outcome of the disaggregation of information distribution would result in more robust interactions between AIS members. More constructive debates may ensue if they are initiated on the listserv but take place on a more appropriate, dedicated forum instead of on the sole communication channel.

The most effective uses of a common wiki platform in the IS discipline might be in its ability to provide AIS members with a single forum for sharing, organizing, and coordinating many of the tasks they are already performing anyway. Peter Gray, who recently launched a wiki dedicated to virtual work, noted that sharing existing materials seemed to be the aspect of the wiki in which contributors were most interested. He noted that, "people seem happy to share existing reusable work products, but that the invitation to discuss and converge on new ideas was not compelling, because nobody engaged the discussion features."⁵ It would be important to develop and adopt some form of community standards for attributing content used in this way, so that the people who develop such content get appropriate credit for doing so. The maintainers of the IS theory wiki are adopting a similar approach, seeking to improve contributions by creating an explicit link with the HICSS minitrack on IS theory. The value of wikis to collaboration in the IS discipline may not be just in the creation of new collaborative opportunities but in providing a more robust forum for existing collaboration.

Nevertheless, these short-term benefits enabled by wikis for supporting existing processes may also enable new collaborative capabilities for the future by establishing a standard for collaboration in the discipline. For instance, a common wiki platform can facilitate research among collaborators at multiple universities by providing an information repository for research teams working on a common project, hosting common files, research notes, and relevant references. As early adopters of wiki technology, we have sought to collaborate with other researchers using wikis in just this way. In instances where those efforts failed, it was primarily because project members were familiar with different wiki platforms, and we unwilling to learn a new platform for the purposes of a single project—especially if we were already using other wiki platforms on other projects. If all IS researchers began using a common AIS-sponsored platform, it could begin to overcome the start-up costs with adopting collaborative technologies, creating shared processes that would enable even more robust collaboration in future research efforts.

⁵Personal communication.

Access to this common platform may also increase membership in AIS, as scholars would need to join this online community to use these tools. Such a wiki platform should have a number of key features. First, it should be open-source, so the collaborative benefits would not be derailed by the future prospects or decisions of a given provider (and would remain cost-effective for AIS to implement). Second, it should be user-friendly. Many wikis are adopting interfaces that are not much more difficult to manage than typical word-processing programs. This feature would be important to create a critical mass of collaboration within the discipline and not just among wiki advocates. Third, it should have the ability to create multiple-levels of privacy protection. Using wikis for research and review would have very different privacy needs than using wikis for teaching, and a common platform would need to support the multiple types of collaborative processes on which our discipline depends.

Conclusion

In this paper, we have argued that Web 2.0 tools, specifically wikis, have begun to influence business and knowledge sharing practices in many organizations. IS researchers have spent considerable time exploring the impact and implications of these tools in organizations, but we argue that those same researchers have not spent sufficient time considering whether and how these new technologies may provide opportunities for us to reform our core practices of research, review, and teaching. In this way, the IS discipline may be like the shoemaker's children, unable to benefit from the very expertise that exists within our own family. We argue that the IS discipline should consider how wikis and other Web 2.0 tools provide opportunities to rethink the way we conduct our core practices. Nevertheless, we are not technological determinists that believe the simple adoption of wikis will yield positive benefits. Users can appropriate IT tools in unexpected ways, and process changes can have unintended negative consequences. Any potential changes to our core processes should be considered critically and carefully.

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COMMENT: WHERE IS THE THEORY IN WIKIS?

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In “The Shoemaker’s Children: Using Wikis for Information Systems Teaching, Research, and Publication,” Kane and Fichman (2009) argue that wikis will enable the IS discipline. The Wikipedia database will enable IS research, the transparency of wikis will enable peer-reviews of manuscript submissions to our IS journals, and the tracking and open contributions on wikis will enable IS teaching.

I completely agree with an underlying assumption of the paper: for the IS field to advance, IS researchers should try innovative technologies and practices. Trying innovative technologies not only provides closer connections to the students, but often stimulates ideas for research as well as an appreciation of the challenges faced by users in working with new technologies. While the authors focus on wikis, I would argue that this assumption should apply to all Web 2.0 technologies. Web 2.0 consists of much more than wikis: social networking tools, mashups, blackberries, MMORPGS (massively multi-player online role-playing games), online prediction markets, tagging, folksonomies, jam sessions, and virtual worlds. While I am quite supportive of the notion of a Wikipedia project on IS, I would suggest that IS researchers not be constrained to Wikipedia for creating publicly accessible IS projects. IS researchers should consider starting a topic on the Programmable Web for research on mashups; create a Facebook profile for IS academics or IS research topics; grow a Linked-In network that connects IS academics to IS professionals; contribute to the IS island on Second Life; hold electronic jam sessions instead of (or in addition to) ICIS; create a mashup hub on IS World where mashups can be posted and statistics on their usage can be tracked; and host online prediction markets where the IS academic community votes on important future options that might affect our lives and research, such as salaries, class enrollments, where our students will be placed next year, new technologies that might have an impact on our theories, new theories that might have an impact on technologies, etc. Apparent from these comments is that Kane and Fichman’s suggestions that we, as IS scholars, should try new technologies will clearly be helpful to the IS community, especially if the IS community expands upon their suggestions to consider the vast array of Web 2.0 technologies beyond wikis.

Despite the importance of the Kane and Fichman’s message, a critical issue that should not be ignored is that, as scholars, we should not simply try wikis, but treat them as a scholarly pursuit. We need to recognize that wikis may be just another tool for which existing theories already account for their adoption, adaptation, communication, and group dynamics. My research on wikis, funded by the Society for Information Management, with Chris Wagner and Dave Yates (Majchrzak et al. 2006; Wagner and Majchrzak 2007) indicates that theories of cognitive coping (Beaudry and Pinnsoneault 2005), elaboration likelihood (Sussman and Segal 2003), adaptive structuration (DeSanctis and Poole 1994), collaborative elaboration (Majchrzak et al. 2005; O’Donnell and O’Kelley 1994), hidden profiles (Stasser 1999), apprenticeship (Lave and Wenger 1991), team adaptation (Burke et al. 2006), ease of use (Davis 1989), social identity in online groups (Bagozzi and Dholakia 2006), and social capital (Nahapiet and Ghoshal 1998) predict quite nicely to behaviors that are observed in organizational wikis. For example, many people do not edit others’ work on a corporate wiki in part because they feel that they would be publicly criticizing the other person, thereby harming their acceptance in the community—a finding predictable by existing apprenticeship models of socialization (Lave and Wenger 1991). Similarly, theories on coping with new technologies (Beaudry and Pinnsoneault 2005) predict why we find many people not willing to change their practices and adopt wiki norms (Leuf and Cunningham 2001). Social capital theory (Nahapiet and Ghoshal 1998) predicts why many people do not contribute to wikis, leaving the existing wikis on IS World under-utilized. I would argue, then, that as researchers, we need to push ourselves in understanding what is different about wikis—in terms of affordances, functionalities, and behavioral use patterns—compared to existing collaborative technologies, which will help us derive new theories or refine our existing theories.

Von Hippel and von Krogh’s (2003) perspectives piece on the open source software (OSS) development community provides an exemplar of how we might use new Web 2.0 technologies to derive new theory. In that piece, von Hippel and von Krogh argue that OSS takes some of the characteristics of the private investment model of innovation and some of the characteristics of the collective action model of innovation and combines them into what they call a private-collective innovation model. They argue that this new model requires fundamental revisions to our theories about innovation.

To create an equivalent theoretical piece for wikis requires that we first think about wiki use-cases as distinguishably

different genres (Orlikowski and Yates 1994). We recognize that a wiki used to create an article with a neutral point of view, for example, is fundamentally different from a wiki used to evaluate others' ideas (as in teaching or peer reviews). Second, we conceptualize, in theoretical terms, the unique affordances that wikis provide. To name a few, these include democratization of contributions (e.g., leveling the playing field so anyone can contribute an idea), new emergent roles in moving conversations forward (pruning, identifying holes needing more discussion, naming conventions, etc.), community-based policing, and separation of dialogue from decision. Third, we need to study how the web of relationships between the wiki functionalities, the organizational design, the norms of use, and the community affect how these affordances play out. Then, we need to take another look at IS theories and those in other disciplines to argue why Web 2.0 technologies may cause us to reconsider our previous theoretical assumptions. For example, theories of contributions to online communities assume that participants are motivated by social exchange (e.g., Roberts et al. 2006) and/or social capital (Wasko and Faraj 2005). Yet many contributors to organizational wikis—what we call Shapers—organize others' contributions not for social exchange or social capital motives, but instead because they are genuinely concerned about the organization's ability to adapt to the needs of a volatile environment (Majchrzak et al. 2006). Not only should findings like this encourage us as researchers to rethink social exchange and social capital theories, but they also should encourage researchers in other domains, such as dynamic capabilities models (Eisenhardt and Martin 2000) to modify their theories to include information shaping as an important dynamic capability of a firm.

In closing, the title of the article by Kane and Fichman, in which they reference a shoemaker's child, carries an additional message that we should not ignore. The fact that a shoemaker's child goes barefoot is not because the shoemaker intentionally keeps shoes away from the child, but because of time and resource constraints. If one's passion as an IS academic is personally trying out Web 2.0 technologies in innovative ways, then following the excellent suggestions of Kane and Fichman will help to fulfill that passion. If one's passion is theory-building, though, watching how the use of Web 2.0 technologies fundamentally changes our theories may be more appropriate. Fortunately, in any vibrant community there is a need, and room for, participants of both persuasions.

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COMMENT: THE WIKI WAY IN A HURRY— THE ICIS ANECDOTE

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Functionality

It's exciting, Kane and Fichman's call to harness novel information technologies to innovate the community's core processes. Many of us have experimented in class with advanced IT, piecemeal and individually, but when it comes to community-wide efforts we ought to work systematically and collaboratively. Take ICIS for example. It's a microcosm of our field, hosting several core processes condensed in time and space. For 30 years, it has been carried on in much the same format; IT has made little impact. Isn't it time we asked what Wiki can do for learning at ICIS? Not quite, not before we reformulate the question.

Kane and Fichman propose that wikis replace textbooks by utilizing available content and developing IS-specific content, that wikis exploit the power of "crowdsourcing" by managing peer evaluations and helping students design their own deliverables, and that wikis facilitate better communication between educators and students. They are right, but there may be other functions that can be supported, by other technologies, with other, unintended, consequences.

Wikis can be used by the community to co-plan ICIS, by enabling a track's participants to integrate knowledge across

individual sessions on the same topic, by enabling a lecturer and participants of a specific lecture to present the materials days before the session, assemble comments during the session and make the resulting document accessible after the session so that knowledge sharing becomes an ongoing process.

In 2007 in Montreal, 20 highly motivated experts worked intensively for over 60 minutes to record and generate ideas that evolved during a lecture. The lecture slides and a wiki, organized according to the slides and seeded with text, were available to the experts in advance. In the session, new ideas were placed on the wiki and displayed to the audience on a second screen to enable multi-communicating (Reinsch et al. 2008). In other words, the lecturer's perspective structured the creation of a wiki-based white paper. The wiki was accessible for further extensions after the session.

Thus, the 20 experts and others in the audience cocreated a body of knowledge that was richer than the original body of knowledge provided by the lecturer (Majchrzak et al. 2008). Most of the expert users claimed the cognitive demands were excessive and that they would not be willing to repeat the experience. It was too demanding to listen to the lecturer, assimilate the information, think of comments, read previous comments, place the comments on the wiki and remember to return to the lecture and the dialog in the room. The wiki way was not meant to be done in a hurry.

Clearly wikis offer a long list of functions, but any community-wide effort should go beyond a list. We should, in addition, analyze the participants' needs and practices, and we should learn from experience.

Needs and Practices

Our conferences are places for sharing knowledge and socializing. The two processes intertwine throughout: in the sessions, corridors, coffee breaks and luncheons, receptions and social events. Moreover, learning relies on both processes; IT should reflect this coupling.

Wikis are well suited for knowledge sharing. The wiki principles of incomplete, incremental and evolving content and of wide, transparent, and easy access (Leuf and Cunningham 2001) ensure most of the requirements of IT for effective knowledge sharing in environments of distributed cognition (Boland et al. 1994). But learning at a conference (and at school) is both personal and interpersonal. People need the time to assimilate new information in light of their own perspective. Blogs, for example, are better suited for personal development than wikis. A combination of blogs and wikis in which people can travel easily between the personal and the interpersonal is needed. Moreover, interpersonal learning in communities of practice occurs when participants learn to think and act within the network of co-learners (Contu and Willmott 2003), and, as social capital theory predicts, members of enhanced social networks will share knowledge more readily (Nahapiet and Ghoshal 1998). IT that supports interpersonal learning should, therefore, support both knowledge sharing and relationships between co-learners. Wikis, for example, may need to be combined seamlessly with social network software. The list of additional functionality needed is endless. A systemic view of our learning needs and practices would determine the effective use of wikis and other technologies, reducing the risk of suboptimal and counter-productive use.

Lessons Learned

Nobody came back after the session to add to the wiki white paper. We shouldn't be surprised. Once the initial enthusiasm has waned, people will not continue investing knowledge and effort when colleagues do not reciprocate (Nahapiet and Ghoshal 1998).

Several efforts to disseminate knowledge in novel ways have not been sustained. MISQ Discovery used multimedia, video, interactivity, hypertext, live data, and other online capabilities to "release us from the box of paper publishing" (from its call for papers 1995). MISQ tried to revive it 10 years later but failed to attract submissions. On a much smaller scale, a hypertext version of an MISQ Review article offered periodic updates and invitations for comments (Te'eni 2001; see also <http://www.misq.org/misreview/teeni.html>, linked to <http://www.tau.ac.il/~teeni/ebook/>).

I gave up two years later. ISpedia, a community equivalent of Wikipedia devoted to IT-related terms went down in July 2008. The administration and content generation may have been too much for too few. In none of these efforts did we obtain a critical mass of contributors to sustain a viable source of knowledge. We built it, but they didn't come. We expected the "we" and the "they" to merge but it didn't happen.

Other communities witness similar difficulties with wikis, including frustration at having your materials modified, fear of the criticism of others, reluctance to give up ownership and work anonymously, fear of destructive input, hesitation to edit the material of others, and uneasiness about taking responsibility for unfinished products that are public (Da Lio et al. 2008). The behavioral, legal, and economic aspects of ownership and sensitivity to ownership by others (e.g., editing rights) will have to be considered in future IT for knowledge sharing.

Changing Our Ways

IT can (and perhaps should) restructure the way we conference (Te'eni forthcoming). Novel IT should be examined in that capacity and redesigned accordingly. Opening the conference to virtual participation seems inevitable. It will no longer be an annual three-day event but a peak activity in an ongoing virtual process of knowledge sharing and socialization; the physical gathering will be crucial to enable the intense knowledge sharing and socialization that can only take place through face-to-face interaction. Wikis could be redesigned to support both interaction modes, the ongoing and the intense interactions.

Ongoing learning requires two types of interrelated memories: personal memory and community memory; both types need to work seamlessly together at the conference and year-round. A participant sitting in a session at the conference should be able to access the community memory (e.g., the AIS e-Library as well as the wiki white paper developing in real time during the session) and simultaneously access his or her personal memory on a PDA, and move information between the two memories.

Finally, IT can personalize the learning experience. Learning styles, for example, abstract versus concrete or textual versus spatial, can be accommodated at conferences by ensuring a variety of media and forms of content. Moreover, helping participants relate the material to their own experiences, stored in their personal memory, would enhance learning (Bruner 1990).

To be feasible, such scenarios require the redesign of infrastructure and applications. Wikis are currently ill suited for many of the scenarios mentioned above but could be adapted and augmented to play a role in future conferencing.

Conclusion

Wikis are not a panacea for all learning situations. Several issues deserve further elaboration before we embark on a community-wide effort to institute them. The ownership of content and its presentation through mixed forms, two aspects of effective knowledge sharing systems (Boland et al. 1994), have not been resolved; neither has the issue of incentives (Nahapiet and Ghoshal 1998). Additionally, we must plan to integrate wikis with other technologies to support socialization for learning and to support situations of intense learning such as synchronous sessions. Partial solutions may do more harm than good.

We should experiment with novel IT, but in addition, we should engage in a systemic analysis of learning and socializing in the community, based on theory whenever possible, learn our past lessons, and envision new forms and processes. Kane and Fichman have taken a first step; we should follow.

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EDITORIAL NOTE

The Issues and Opinions article by Kane and Fichman is designed to stimulate discussion about ways of using Web 2.0 technologies in general, and wikis in particular, to improve reviewing, teaching, and research in our discipline. The comments by Majchrzak and Te'eni published with this article stress the need for theoretical underpinnings and describe the use of wikis at a major Information Systems conference (i.e., ICIS), respectively. The review for this paper was unique in that it was conducted on a wiki. I encourage you to see how this review process unfolded at <http://www.socialtext.net/misq5040/>. Visiting the wiki may prove helpful in three ways. First, it demonstrates how wikis can be used in the reviewing process. Second, it makes the reviewing process of this Issues and Opinions article transparent. Like most other Issues and Opinions articles, this paper had two reviewers who were either members of the *MISQ* editorial board or senior researchers in the topic area. Issues and Opinions articles usually do not have an individual serving in the role of Associate Editor. Third, it affords you the opportunity to comment on the points raised by the authors and commenters. Keri Pearson has started the dialogue with a blog entry at the wiki site. She wonders if the suggestions in this Issues and Opinions article, while commendable, are merely paving the cow paths, rather than breaking new ground. Do you have any thoughts about how to break new ground in terms of the reviewing process? In terms of using wikis for teaching purposes? If so, please add them to the blog.

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