Comments on Greenhow, Robelia, and Hughes: Technologies That Facilitate Generating Knowledge and Possibly Wisdom

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Technologies that Facilitate Generating Knowledge and Possibly Wisdom:

A Response to "Web 2.0 and Classroom Research"

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Abstract

Greenhow, Robelia, and Hughes (2009) argue that Web 2.0 media are well suited to enhancing the education research community's purpose of generating and sharing knowledge. My response first articulates how a research infrastructure with capabilities for communal bookmarking, photo/video sharing, social networking, wikis, and mashups could enhance both the pace and quality of education scholarship, complementing federal investments in cyberinfrastructure. Then, I argue for a second, more provocative and controversial usage of this research infrastructure: an experimental attempt to generate "wisdom." An interconnected suite of Web 2.0 tools customized for research would provide three capabilities important for wise advice: (a) a virtual setting in which stakeholders of many different types could dialogue (b) about rich artifacts grounded in practice and policy (c) with a set of social supports to encourage community norms that respect not only theoretical rigor and empirical evidence, but also interpersonal, experiential, and moral/ethical understandings.

Technologies that Facilitate Generating Knowledge and Possibly Wisdom: A Response to "Web 2.0 and Classroom Research"

The education research community frames its purpose as generating and sharing knowledge (National Research Council [NRC], 2002). This is seen as a well-defined process spanning a variety of fields:

> Scientific inquiry is the same in all fields. Scientific research, whether in education, physics, anthropology, molecular biology, or economics, is a continual process of rigorous reasoning supported by a dynamic interplay among methods, theories, and findings. It builds understandings in the form of models or theories that can be tested. Advances in scientific knowledge are achieved by the self-regulating norms of the scientific community over time, not, as sometimes believed, by the mechanistic application of a particular scientific method to a static set of questions. (NRC, p. 2)

Greenhow, Robelia, and Hughes (2009) present a strong argument that Web 2.0 media are well suited to enhancing the scholarly process. Adapting these tools to aid the education research community makes sense, given that these media can promote richly documented, rapid interchanges among groups of scholars sharing and discussing research representations, theories, methods, findings, and models. My response first articulates how a research infrastructure based on Web 2.0 tools might function and later argues for a second, more provocative and controversial usage of this research infrastructure: an experimental attempt to generate "wisdom."

Enhancing Knowledge Creation and Sharing

The role of information technology in aiding the process of education research is is instrumental (Dede, 2008a). Information and communication technologies (ICT) aid a community of scholars with developing representations, evolving theories, refining methods, interpreting findings, and postulating models in a manner parallel to how carpenters would use saws, hammers, screwdrivers, and wrenches to help construct artifacts. The two key points in this analogy are (a) the tools make the job easier, and (b) the result is of higher quality than possible without the tools.

As part of a graduate course this past fall on emerging educational technologies, my students and I studied 10 forms of Web 2.0 tools in terms of their potential to enhance learning by promoting creativity, collaboration, and sharing. Retrospectively, I categorized these media into three groups:

1. *Sharing*
    - Communal Bookmarking
    - Photo/Video Sharing
    - Social Networking
    - Writers' Workshops/Fanfiction
2. *Thinking*
    - Blogs
    - Podcasts
    - Online Discussion Forums
3. *Co-Creating*
    - Wikis/Collaborative File Creation
    - Mashups/Collective Media Creation

- Collaborative Social Change Communities

Such a categorization by purpose seems more useful in assessing the differential utility of media than the Greenhow et al. grouping of *interconnections*, *content creation and remixing*, and *interactivity*. However, like all category systems, the number of groups is somewhat arbitrary; and, depending on how they are used, particular media can blur from one category into another (e.g., writers' workshop/fanfiction can approach co-creation rather than sharing if authors routinely and extensively revise based on iterative feedback from other community members).

A geographically distributed community of scholars studying a particular topic in education might use a research infrastructure mingling many of these Web 2.0 tools to enhance both the pace and quality of their work. (The description that follows is a more focused overview than that of Greenhow et al., to illustrate that a small range of tool types could produce a powerful research infrastructure.)

At the level of sharing, through communal bookmarking (e.g., http://www.diigo.com/), the group could continuously scan the educational context for resources of interest, including non-archival material such as unpublished papers and YouTube videos. Photo/video-sharing tools (e.g., http://voicethread.com) could enable sharing and annotating research data as multimedia artifacts, such as student products and video records of teaching. A ning (e.g., http://www.ning.com) could provide background information to foster informal professional exchanges among members of this community, empowering the "social scholarship" Greenhow et al. describe. A wiki (e.g., http://writer.zoho.com) could serve as the basis for a negotiated exposition of theoretical principles; the theoretical wiki at the National Science Foundation (NSF)-funded

Pittsburgh Science of Learning Center (http://www.learnlab.org/research/wiki/index.php/Main_Page) illustrates the value of this. Mashups (e.g., http://healthmap.org/en) could offer ways to contextualize individual datasets against a larger context of practice.

Such a research infrastructure could also serve other purposes beyond enhancing the scholarly productivity of its community. For example, federal agencies such as NSF are now mandating external evaluations on their funded research projects, to document that the processes of scholarship used are appropriate and effective. The participation of a particular research project in a larger scholarly community as described above could serve as such an evaluation. Also, case studies based on scholarly processes richly documented in such communities could enhance the teaching of research methodology by offering richly grounded examples, including alternative perspectives on complex designs involving mixed methods.

The NSF's strategic initiative in "cyberinfrastructure" is providing leverage for the development of online communities of scholars (Dede, 2008b). In recent years, the NSF has championed a vision for the future of research that centers on the integration of computing, data and networks, digitally enabled sensors, observatories and experimental facilities, and an interoperable suite of software and middleware services and tools (NSF Cyberinfrastructure Council, 2007). As a result, in the scientific research community, gains in computational speed, high-bandwidth networking, software development, databases, visualization tools, and collaboration platforms are reshaping the practices of scholarship and beginning to transform teaching.

With NSF funding, the Computing Research Association (CRA) convened four workshops, attended by experts in education, with four distinct foci (CRA, 2005):

1. Modeling, Simulation, and Gaming Technologies Applied to Education
2. Cognitive Implications of Virtual or Web-enabled Environments
3. How Emerging Technology and Cyberinfrastructure Might Revolutionize the Role of Assessment in Learning
4. The Interplay Between Communities of Learning or Practice and Cyberinfrastructure

Collectively, these groups envisioned an educational research cyberinfrastructure that provides:

> 1) unprecedented access to educational resources, mentors, experts, and online educational activities and virtual environments; 2) timely, accurate assessment of student learning; and 3) a platform for large-scale research on education and the sciences of learning. Moreover, the new educational cyberinfrastructure will make it possible to collect and analyze data continually from millions of educational activities nationwide over a period of years, enabling new advances in the sciences of learning and providing systematic ways of measuring progress at all levels. (CRA, 2005, p. 1)

The full vision of cyberinfrastructure goes well beyond today's Web 2.0 tools, but is a logical evolution of the vision Greenhow et al. describe for using these interactive media immediately to enhance educational research.

In contrast to the relatively conventional ideas above, my second suggestion for using Web 2.0 tools in education research moves beyond enhancing current scholarly practices for producing knowledge to initiating a new form of professional dialogue: sponsoring communities that attempt to generate "wisdom." I am aware that this suggestion is provocative, controversial, and risky; nonetheless, I believe such an experiment is worth conducting.

Communities that Develop Collective Wisdom

For the last several millennia, scholars have wrestled with various definitions of "wisdom" (Birren & Svensson, 2005). Historical definitions of individual wisdom stress, in various proportions, an integrated perspective that includes: expertise about the pragmatics of individual and social life, as well as the natural world; attitudes and behaviors based on considerations of virtue and morality; and an awareness and acceptance of one's own fallibility and limitations. Wise cultures are seen as collectively having these characteristics and as maximizing the development of wise persons through generating and sharing knowledge, in part through communal reflection and social dialogue. According to Birren and Svensson (2005), "Wisdom is perhaps the most complex characteristic that can be attributed to individuals or cultures" (p. 28).

The particular type of wisdom I am discussing has five dimensions:

1. a *cognitive* dimension involving rich understanding of a variety of intellectual disciplines and fields;

2. a *practical-experiential* dimension of sophisticated, pragmatic comprehension about how to act given the unresolvable questions, philosophic issues, and unavoidable

problems (such as personal mortality) associated with everyday life (Baltes & Smith, 1990);

3. an *inter-personal* dimension of insightfully appreciating the interactions and contributions of diverse groups, cultures, and societies in shaping civilization;

4. an *ethical* dimension encompassing what the ancient Greeks meant by 'knowing and doing the good'; and

5. a *meta-cognitive* dimension of reflective judgment, being aware of the limitations of knowing and how these impact resolving ill-defined problems (Birren & Fisher, 1990; Kitchener & Brenner, 1990).

This definition draws on, but is more limited than, the concept of *extraordinary wisdom* delineated by Randall and Kenyon (2001).

The key contrast I wish to make is between this five-dimensional definition of "wisdom," and widely accepted definitions of "knowledge." A person who is knowledgeable about academic content and skills would incorporate the cognitive dimension above. Someone who is knowledgeable about making optimal life choices would possess the practical-experiential dimension (teachers' professional subset of this is often described in education as the "wisdom of practice"). These people could also meta-cognitively understand that these types of knowledge cannot in themselves provide complete answers to all questions. However, the interpersonal and ethical dimensions of wisdom transcend the epistemology-based expertise of knowledge to include moral, axiological, and subjective/inter-personal capacities of high value to oneself and others.

In other words, knowledge involves understanding the dynamic forces that shape one's life, including its natural and social context, but does not intrinsically include a

capacity to make value-driven, moral choices that empower use of that understanding for personal and collective wellbeing across the full dimension of human needs. As an illustration, if one uses Maslow's (1954) hierarchy of needs as a referent, knowledge provides substantial leverage in relieving the physiological "deficiency" needs that encompass the bottom four levels of his hierarchy (survival needs, safety and security, love and esteem from others, feelings of self-worth and belonging), but knowledge alone falls short in attaining Maslow's fifth, self-actualized level of "growth" needs (e.g., spontaneity, creativity, closeness to others, appreciation for all aspects of life, making contributions that through ethical means resolve troubling problems with complex moral dimensions). People who have focused their personal learning solely on mastery of knowledge often lack many of these "growth" characteristics, and knowledgeable people who are self-actualized have attained their "wise" capacities through developing interpersonal and ethical understandings outside the realm of knowledge.

To ground this contrast between wisdom and knowledge in a specific example, consider attempting to resolve a "wicked" problem in education. These types of problems have four characteristics (Conklin, 2006):

1. Stakeholders have different worldviews for framing the problem.
2. Constraints that define the problem and resources to resolve it change over time.
3. The problem cannot be fully comprehended without attempting solutions and studying the ways they fail.
4. The problem is never completely "solved."

Attaining educational equity is such a problem; and Greenhow et al. raise research questions about Web 2.0-related aspects of equity in their article. Hypothetically, a team

of researchers could with much effort generate the complicated systemic relationships that together create inequities in education and could develop dynamic models that contrast the likely effects of various interventions in ameliorating these. Such a team could also assess the psychosocial, economic, and cultural impacts of educational inequities–and interventions to reduce inequities–on various groups, in order to generate estimates of the potential benefits and costs of different actions decision makers could take to affect this issue. Such knowledge-based contributions would have great value, but in themselves would intrinsically fall short of resolving difficult policy and practice questions that then arise, because these questions are in the province of wisdom rather than knowledge.

To articulate a small subset of such questions as an illustration, consider the complex influence of ICT in creating and reducing educational inequities. In order to ameliorate inequities, should stakeholders in education slow the adoption of new interactive media in schooling—bypassing at present their potential benefits in student and teacher motivation, learning and assessment—because the economic resources required could instead tactically aid with other issues related to inequities, such as hungry children, large class sizes, and underpaid teachers? Or should stakeholders in education instead push forward with these technologies, even though inequities may initially widen due to issues of access outside of school, because new media's potential to engage and individualize is strategically important for enabling learners diverse in their backgrounds the opportunity to reach their full potential—and because the online identities Greenhow et al. describe may help students with low academic self-efficacy reengage with classroom learning (Dede, 2009)? Knowledge can inform our thinking about these

complex questions, but wisdom that draws on inter-personal and ethical dimensions is required to develop "good" answers.

How could the research infrastructure for knowledge production described above enable an experiment in generating wisdom? An interconnected suite of Web 2.0 tools customized for research would provide (a) a virtual setting in which stakeholders of many different types could dialogue (b) about rich artifacts related to practice and policy (c) with a set of social supports to encourage community norms that respect not only theoretical rigor and empirical evidence, but also interpersonal, experiential, and moral/ethical understandings. For example, in terms of the wicked problem sketched above, teachers could bring the "wisdom of practice" into such a community (Hatch et al., 2005), and community representatives could articulate social and cultural norms reflective of their diverse values. These three capabilities of a research infrastructure seem essential for a community attempting to generate wisdom about educational issues; only in the past few years have ICT made these affordances widely available, practical, and inexpensive.

Why would the education research community want to sponsor such an experiment in complementing knowledge production with a process for articulating wisdom? The very idea may seem unwise: What about the "objectivity" of research? Beyond what theory and empirical evidence can offer, how can scholars in education judge the relative value of various moral, axiological, and subjective/inter-personal perspectives as they contribute to wisdom? Is this not the province of philosophers and preachers, community organizers, and proselytizers?

Perhaps in attempting to foster collective wisdom I am demonstrating only my individual foolishness. However, the more I see the limited impact of "pure" knowledge on wicked problems, the more I believe that we as professional scholars have a responsibility to go beyond generating just findings and theories–even though assuming such a responsibility means acknowledging the value of contributions from people whose epistemologies, standards, and values differ from our own. Quite possibly, an experiment in generating wisdom along the lines I suggest might fall far short; yet an "interesting" failure could provide the seeds of new insights about how to tackle the wicked problem of moving beyond the limitations of knowledge.

Conclusion

This response begins with a quote from the NRC report on education research; in part, it says, "Advances in scientific knowledge are achieved by the self-regulating norms of the scientific community over time, not, as sometimes believed, by the mechanistic application of a particular scientific method to a static set of questions" (p. 2). The advent of Web 2.0 technologies does not change this observation; the power of research communities lies in the people who comprise them rather than the technological infrastructures that enhance the activities of those people. I concur with Greenhow et al. that emerging interactive media offer fascinating opportunities to enhance our scholarship. Perhaps they offer even the opportunity to experiment with a superset of scholarly norms that provides leverage on wicked problems.

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