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# Toward a Set of Theoretical Best Practices for Web 2.0 and Web-Based Technologies

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## Meridian K-12 School Computer Technologies Journal

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# Toward a Set of Theoretical Best Practices for Web 2.0 and Web-Based Technologies

Matthew Kruger-Ross and Lori B. Holcomb

#### Abstract

Many educators are excited by and support the innovative and pedagogically invigorating technologies offered by the interactive and collaborative Web 2.0 movement. To date, much of the research on the integration of Web 2.0 tools has focused on technical and procedural generalizations about how one might incorporate these technologies into the classroom. While some research has addressed content-specific uses of these tools, only a limited amount has explored best practices for using these technologies to encourage learning. While these studies are groundbreaking and serve an important purpose, this article aims to shift the ongoing conversation toward a first-draft theory of potential best practices for web-based technology use. Suggestions for both specific and general best practices are examined, with the aim to both support and empower readers to actively explore and integrate these new technologies into the classroom.

*Keywords:* Web 2.0, web-based tools, K-12 education, educational technology, best practices, pedagogy

#### **Toward a Set of Theoretical Best Practices for Web 2.0 and Web-Based Technologies**

The field of educational technology is growing and evolving at a rapid pace. With the emergence of Web 2.0 tools, educators are now able to integrate a vast array of technologies that support teaching and learning in innovative and authentic learning environments. It is undeniable that Web 2.0 tools have had a strong impact on education (Dawley, 2009; Dede, 2008; Green, Brown, & Robinson, 2008; Siemens, 2006). Effective and meaningful integration of these tools has the potential to impact not only pedagogical approaches but also student learning. This paper aims to shift the conversation from what types of technologies exist to how best to use these Web 2.0 technologies in educational contexts—namely, the elucidation of possible *best practices*.

Many educators are excited by and support the innovative and pedagogically invigorating technologies offered by the interactive and collaborative Web 2.0 movement. What began with blogs, wikis, and podcasts has grown into a plethora of Web 2.0 tools and web-based technologies. In fact, it is difficult to stay abreast of all the latest Web 2.0 tools, as new tools are materializing every day. Fortunately, multiple online directories are available that are frequently updated (e.g., <http://www.go2web20.net/>, <http://www.feedmyapp.com/> and <http://www.onlinedegree.net/100-essential-2-0-tools-for-teachers/>) to help identify and track the ever-expanding array of open-source technologies.

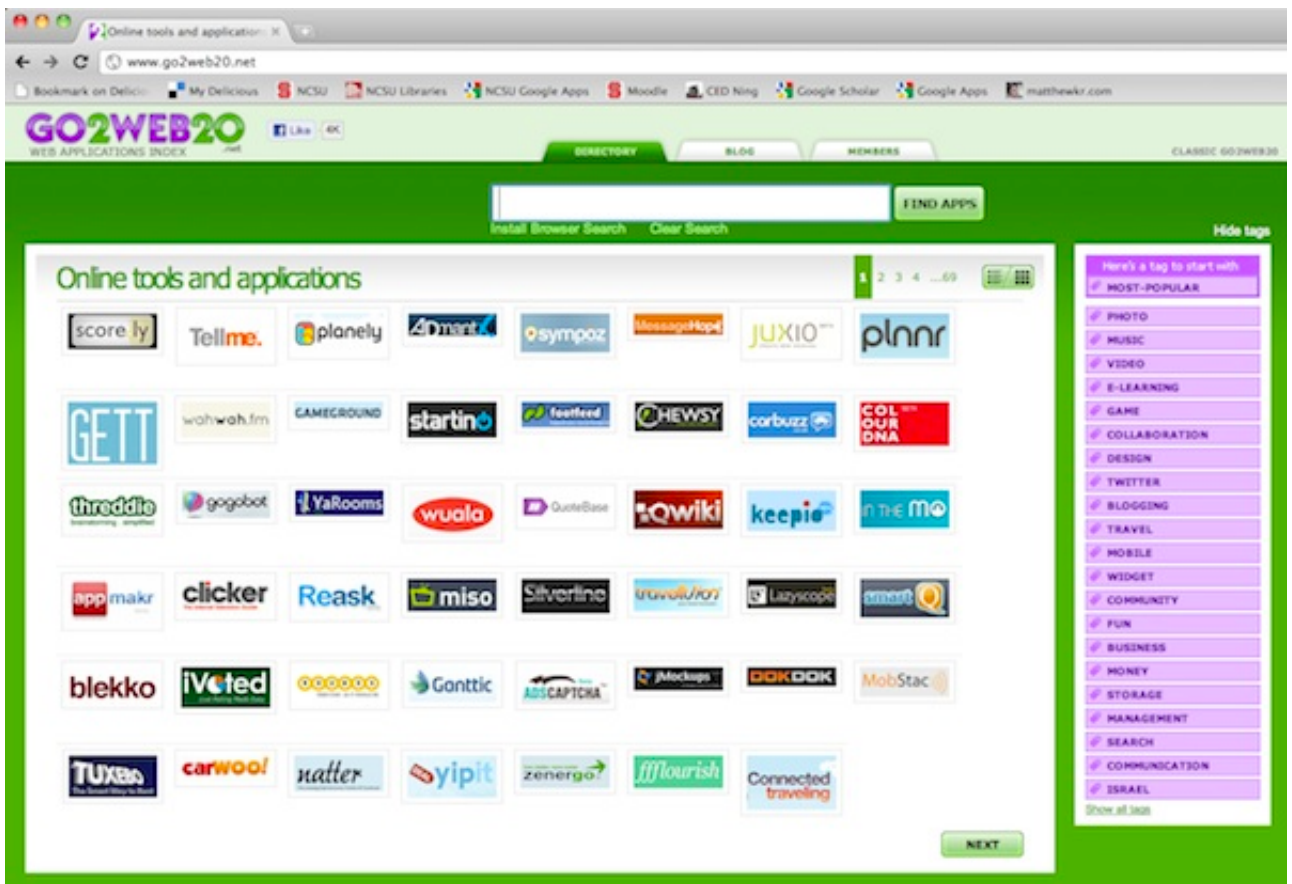


Figure 1. Screenshot of Go2Web20, an online directory for teaching resources.

These new technologies have the potential to change the way teachers teach and radically alter the way we define learning and education—examples include Siemens' (2006) connectivism learning theory; Mishra and Koehler's (2006) technological pedagogical content knowledge (TPCK) model; Papert and Harel's (1991) constructionism theory; Wesch's (2006) anthropological introduction to YouTube; and Turkle's (1995) work with virtual worlds. In recent years, the educational community has started to explore ways in which one can use Web 2.0 technologies to support and enhance teaching and learning. This is evident in the literature, blogs, podcasts, and other forms of media that have burgeoned with information, perspectives, and reflections from both scholars and practitioners about how we can best use these technologies in educational settings (Ross & Williamson, 2009).

To date, much of the research on the integration of Web 2.0 tools has focused on technical and procedural generalizations concerning how these technologies might be incorporated into the classroom. While some research has addressed content-specific uses of these tools, only a limited amount has explored best practices for using these technologies to encourage learning. Some researchers (e.g., Conrad & Donaldson, 2004; Hendron, 2008; Palloff & Pratt, 2001; Warlick, 2004) have explored ways in which these new technologies can redefine pedagogy, even assisting with the creation of new areas of study and literature in online learning, online pedagogy, and both learning and teaching in online contexts. While these past research endeavors are groundbreaking and serve an important purpose, this article aims to shift the ongoing conversation toward a first-draft theory of potential best practices for web-based technology use.

Next, we provide a brief overview of Web 2.0 and web-based technologies, followed by a description of the philosophical and epistemological implications for embracing these technologies. Additionally, we offer two forms of best practices. First, we offer a list of "in general" best practices, which should serve as overarching practices for teachers and learners. We also generated a second list that addresses specific possibilities of how to best frame the use of Web 2.0 and web-based technologies to support teaching and learning. Second, we offer a brief exploration of some of the more popular tools, along with how one might apply these tools in practice. These reflections should serve as an introduction for K-12 classroom teachers as well as an opportunity to advance conversation among educators of all levels.

## Drawing Boundaries

The Web 2.0 movement is predicated on the notion that online environments provide each user with the opportunity to interact with, change, adapt, and generate his or her own information, which can subsequently be interacted with, changed, and adapted (Hendron, 2008)—rather than simple posting and consuming of text and media. This creates value in creating software and tools that are relatively inexpensive, if not free, with the understanding that users will help in the continued development of the software and will provide candid feedback to the software developers. Because many of these web-based tools are inexpensive (or free) and easy to access, their presence in K-12 classrooms has proliferated.

Many have argued that the term “Web 2.0” is ill defined, overused, and misunderstood, and thus reject its use (Berners-Lee, 2006). We agree this is an ill-defined term, and likely outdated; in fact, the term “web-based technologies” encompasses tools categorized as Web 2.0 technologies. Regardless, we use the terms interchangeably with the understanding that most if not all of the technologies are web based. These technologies and their burgeoning uses are often described as “movements” to guide the understanding of their growth relative to time and the types of technologies that are available. Within these Web 2.0 or web-based movements, we would be remiss to not situate them within the larger open source movement and philosophy.

Beginning in the late 1990s and early 2000s, a group of software developers began experimenting with sharing their work and, in essence, their coding. Until this time, most software was coded by either individuals or groups of individuals, licensed by companies and businesses, and then sold to other commodities. This group chose to take a different route and share their work with each other with the understanding that sharing and co-authoring would lead to a better end result. This led to the formulation of the *open source* model—that is, the source code for their work would remain open and freely adaptable by others as long as credit would be given to the original developers. In some instances, it was even acceptable for developers to build upon open source code and then sell the end results; however, this is more of an exception rather than the rule.

The open source movement helped spur the development of the first wave of web-based tools such as blogs and wikis. Key components of this movement include free, open, and adaptable information that is contextualized within an ethos of creativity, community, sharing, and hope. Relative to the current state of affairs in many K-12 and higher education institutions, the open source and web-based technology movements have helped set the stage for this aforementioned revolution in learning and teaching. Rather than turn to high-stakes assessments and to the continued view of information and knowledge as a commodity, many educators have turned to these movements and the technologies they offer. As such, educators are having to examine, reflect, and critically analyze their beliefs about teaching, learning, education, knowledge, and schooling.

### Transforming Frameworks

Prior to the technological advancements covered herein, education, teaching, and learning were viewed as the responsibility of teachers in classrooms that were categorized by both age and subject matter. Teachers were often trained either in relation to a specific age group or to a specific subject matter, and learning was to happen between the hours of 8:00 a.m. and 3:00 p.m. Preferably, learning happened in small chunks of time devoted to specific subjects (e.g., math is learned from 10:05 a.m. to 10:55 a.m.). Knowledge was thought to exist within books and even more so in the heads of teachers and other adults (for a more in-depth exploration of these ideas see Warlick [2004] and November [2001]). It is our contention that teachers and traditional educational institutions should no longer ignore these developments, and should increase the availability of technology. Students and parents realize that knowledge does not exist in books or in the teachers' heads—indeed, knowledge has become a more ethereal concept in recent years. In his reflective article, Dede (2008) opines explicitly about how web-based technologies are changing our epistemologies (i.e., how we know what we know and what can be known).

Rather than being intimidated and overwhelmed by such matters, however, we see these transitions in technology to be deeply empowering for teachers and learners and it is to this end that we have generated a beginning list of best practices for navigating an ever-evolving, ever-adapting, and incredibly exciting new world.

### General Best Practices

*Get to know your context or lay of the land.* For some, this includes the examination of additional

resources focused on defining Web 2.0 technologies. Additionally, it is important to consider what implications Web 2.0 technologies may have for online learning. For others, this means jumping onto a search engine (e.g., Google), searching for a new tool, and then beginning to explore from there. Regardless of the method, you must allocate effort toward trying out the various technologies. Until you do some exploration, the idea of Web 2.0 technologies will likely seem to be an abstract concept.

Where to go from here?

- Visit and peruse the Wikipedia entry on Web 2.0 at [http://en.wikipedia.org/wiki/Web\\_2.0](http://en.wikipedia.org/wiki/Web_2.0)
- View Michael Wesch's YouTube video on exploring Web 2.0 ideas at <http://www.youtube.com/watch?v=6gmP4nk0E0E>

- Visit and read Will Richardson's prolific educational blog at <http://weblogg-ed.com/>

*Set boundaries for yourself.* All too often, new users invest in the web-based technologies without much forethought, embracing and committing to 15 to 20 new tools. These users often end up overwhelmed, stressed out, frustrated, and disappointed. Instead, choose an activity, lesson, or hobby to explore, and identify a select few tools to try out and explore. Give yourself ample time to learn more about how best to use these tools.

Where to go from here?

- Set specific time limits for your various explorations
- Choose two or three tools to commit to learning and integrating into your teaching
- Enlist the opinions and feedback of peers and family members

*Ask for help.* The web-based movement allows for a highly interactive community, where persons are always present who are willing to offer assistance. This may take the form of a written tutorial, a post on a community forum or board, or a video tutorial posted on YouTube. In some cases, the

developers themselves even create resources for users, and might even be accessible for support via Email or telephone.

Where to go from here?

- Identify both the FAQ and Help locations on the website where the tool is housed and bookmark them for future recall
- Locate and join the community of users that are actively using your chosen technology
- Bookmark additional resources, including podcasts and videos posted on YouTube or Vimeo

*Establish relationships.* If you find a tool that you like and can integrate it into your life or your teaching, take the time to reach out to the developers and let them know how you intend to use the fruits of their labor, or simply let them know that you are grateful for their sharing. In some instances, they may even ask you to help with the next iteration of the technology, or they may ask what you would improve about the service. In addition, other users are likely present who are equivalently passionate about the tool—reach out to them and connect. Begin communicating with new users and those who may not know as much about the tool or Web 2.0 technologies in general. Generate a tutorial and post it online for others to use. Give back to the community!

Where to go from here?

- Begin a journal or a blog to chronicle reflections about your journey with the technology
- Create a Twitter account or join an outside social network to connect with others
- If you run into a problem that you think others might have, generate a tutorial and post it on your blog or on YouTube

*Beta and future directions.* There are a few words of caution. Many web-based tools are in a state known as beta, meaning that this is the second release of the software—this follows a state known as alpha, which is typically a private and limited release. In many cases, a beta release will only be offered to a limited number of users. However, as in the example set by Google with Gmail, the web-based platform can remain in beta for years before transitioning to an official release. It is important to recognize that if a tool is still in beta then not all of the functions may work, and it is possible to lose some of your data. Once you have established a relationship with the developer and other users, you will have a better idea about the direction that the tool will take in the future. Will they be moving to a paid option soon? Is that something you are comfortable with? Is there a possibility that they might be merging with another company or that they might be enveloped by another? What are their beliefs on privacy, sharing, and copyright? You will feel more at ease being knowledgeable of the answers to the aforementioned questions.

Where to go from here?

- Search online to see what others are saying about the tools you choose
- Reach out to developers for their feedback on next steps
- Ask many questions to everyone (developers, discussion boards, technical support)

*Passwords.* The majority of web-based tools require you to generate a password-protected account using a username, often an Email address. You may find yourself developing a long list of usernames and passwords for the tools that you use. Many users have their browsers remember all of their passwords; however, this does not help in the instances where these users access their information and tools via some other computer with an Internet connection. It is best to record all passwords and usernames. Although most services give you the opportunity to reset passwords and usernames, this process can get frustrating and can be a pitfall for a novice user.

Where to go from here?

- Review the password management tools referenced on the following website and select the one that best meets your needs:  
<http://lifehacker.com/5529133/five-best-password-managers>

- Create a document on your computer with all of your passwords, and make sure that it is a password-protected file

### Best Practices for Teaching & Learning

*Learning before technology.* We included this as the first of the following best practices because it is a mistake that is made all too often. Simply exploring, playing with, and developing a liking toward a given web-based technology is insufficient rationale for attempting to integrate it into a learning environment. The efficient and effective interrelationship between teaching and learning is a complex process that cannot be reduced to the following oversimplification: *more technology equals better learning*. Learning must be *supported* by technology, not *driven* by it.

*Sound methods and pedagogy.* Web 2.0 tools are used most effectively when they are connected with a sound methodology and pedagogy. Web 2.0 and web-based tools are just that: tools. Effective educational experiences occur as a result of thoughtful methods and practices, not because the newest, latest, and greatest tool has been introduced into the environment. Mishra and Koehler (2006) generated a theory of teacher knowledge called TPACK, which was developed to encapsulate the immense and interconnected nature of the knowledge that informs an effective teacher. In short, Mishra and Koehler proposed that teaching involves a sophisticated relationship between a teacher's (a) knowledge about how to best use technology for teaching, (b) knowledge about how to best teach, (c) knowledge about the content, and (d) how the prior three interact to form a highly effective teacher. Research on TPACK is but one area of an emerging field aimed at further developing theoretical frameworks for studying teaching, learning, and technology.

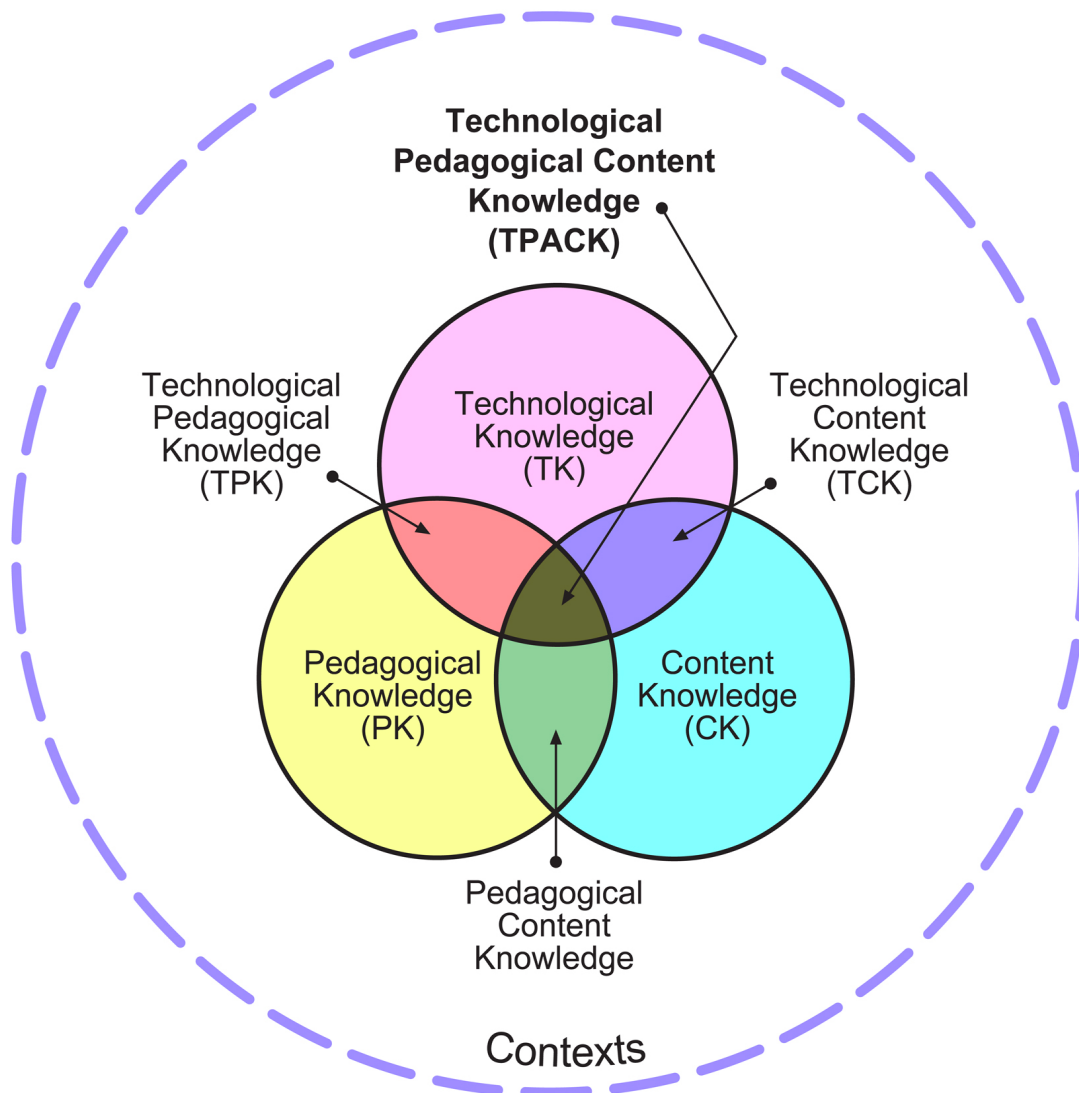


Figure 2. TPACK model [from TPCK.org](#)

*Share.* A large number of teachers have an active presence online. Many write, share, and post about their use of web-based technologies in their classrooms. Shareski (2010) opines that education is, at its core, an activity based on sharing. We encourage you to build a community and start sharing your experiences, including what you have learned and what support that you may need. You might be able to explore additional technologies with other users and get ideas about how they might be incorporated into your classroom. One of the latest teacher buzzwords is *professional learning community* (PLE; or personal learning community, professional learning environment, personal learning experience, etc.). In short, a PLE is a formal or informal group of individuals who share information and knowledge about web-based technologies to further their development, knowledge, and proficiencies. Theoretical frameworks exist that are beginning to address these communities of learners and the redefinition of education, which include connectivism (Siemens, 2006) and Dawley's (2009) social network knowledge construction. The fields of education and educational technology are also being buoyed by the influential work of scholars in other fields including Boyd (2010) in social networks, Turkle (1995, 2005) in sociology, and Wesch (2007, 2008a, 2008b, 2009) in anthropology.

*Children are not digital natives.* One should not assume that children have an inherent understanding of technology. The beginning of the current decade saw much literature in the popular media and academia on the notion of students today as digital natives, as more technologically adept than older persons and generations (Bennett, Maton, & Kervin, 2008; Zur & Zur, 2010). Such an overgeneralization is inappropriate. While it may seem that students already "get it," it is also possible that this apparent technical expertise is actually just an eagerness and a willingness to give the technology a try. Still others assume that because students can use the Internet, YouTube, and a cellular telephone, that they will automatically know how to properly format a Word document or cite a picture on a blog. Students need to learn how to appropriately and effectively use the technology that you use in the classroom. That learning can happen as a result of direct instruction, through group work, online tutorials and resources, or through any number of other avenues. It is vital that this learning takes place, regardless of the specific avenue.

*Feedback, reflection, and revision.* It is important not to get frustrated if a lesson does not turn out as planned. Do not fall into the trap of the blame game: blaming the technology (even if the site did crash) or blaming the children (because they just could not pay attention). Get as much open and honest feedback as possible from students. Invite other teachers and colleagues into your classroom and have them provide feedback as well. If possible, write online (e.g., journal or blog) about your experiences and get people to read these reflections and give feedback. Use all these sources of feedback to revise your lesson or activity and give it another attempt.

*Rethink evaluation and assessment.* Regardless of how web-based technologies are used, we hope that many educators have started the journey of exploring alternative ways of assessing student learning and progress. Think diligently about how you will evaluate the extent to which students are working effectively with the tools that they are using and how you will give them relevant feedback. With web-based tools in particular, evaluation should focus on quality of thought and process rather than sole focus on the end result (e.g., quiz or test). Develop rubrics to help guide you through the process of determining what you will be looking for in students' works, and help each student develop the ability to evaluate his or her own work by sharing the rubric with them and encouraging them to edit and adapt the rubrics.

*Become a creative commons advocate.* Learn as much as possible about Creative Commons (CC) by visiting their website or by consulting others who have written about it or who are providing tutorials on it (e.g., Lucier, 2010). In large part, CC has been the backbone of the open source and web-based movements.



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Figure 3. Screenshot from Creative Commons' website.

### Conclusions

The field of education is poised to make great strides in its approaches to teaching and learning through the integration of Web 2.0 tools. These emerging technologies make it possible for us to expand and potentially redefine the boundaries of education. From altering pedagogical strategies to providing students with authentic learning opportunities, Web 2.0 tools are allowing us to push the boundaries of learning. However, with any educational undertaking, the integration of Web 2.0 tools must be well planned and critically examined. Simply integrating emerging tools into teaching and learning is not enough. Educators must connect these tools with sound pedagogy and align their integration with curricular goals and standards. Educators must be open to not only the integration of Web 2.0 tools into their teaching practices, but also to engaging in the collaboration synonymous with Web 2.0 technologies. That is, educators must be willing to share, engage, and collaborate with others to further education. By addressing, adhering to, and expanding upon the best practices recommended herein, educators will be equipped to identify and effectively integrate Web 2.0 technologies into their teaching practices.

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