Abstract

Constructivism, a currently popular learning theory informed by the work of Dewey, Piaget, and Vygotsky, values collaboration and experience as the keys to learning. According to this theory, knowledge is constructed rather than transmitted. The constructivism that emerged in the 1990s involved face-to-face interactions between students. By integrating Web 2.0 applications, today’s educators have the opportunity to practice a digitally enriched style of constructivism: constructivism 2.0. This paper explores the intersection of constructivist learning theory and Web 2.0 applications.
Introduction

As an epistemology, constructivism rests on the theory that knowledge is constructed through collaboration and experience; therefore, learners in a constructivist environment engage in activities that promote hands-on learning and collaboration. As constructivism transformed classrooms the 1990s, teachers were encouraged to foster student collaboration through face-to-face learning activities, such as jigsaws and learning circles that “comprise two to six members … who come together to share text resources and help each other learn” (Vacca and Vacca, 1996, p. 64). With the arrival of interactive white boards, laptop carts, and Web 2.0 applications that have transformed the Internet from being a source for information to become a vehicle for storing and retrieving files, for communicating and collaborating between users, and for creating and sharing information, educators have new tools for creating hands-on, collaborative learning opportunities that promote the sharing, remixing, and publishing of digital knowledge that characterizes a new digitally enriched constructivism, constructivism 2.0.

Constructivism(s)

Kotzee (2010) underscores the myriad uses of the term constructivism, a word that, therefore, necessitates definition. He reports “there are so many possible variants of constructivism (besides the main versions – ‘radical’ and ‘social’ constructivism – one finds ‘contextual’, ‘sociotransformative’, ‘sociocultural’ and other constructivisms) that one might doubt whether constructivism is one position” (p. 178). To the sub-labels Kotzee identifies, one may add “individual constructivism” (Smith and Ragan 2005, p. 19) and “cognitive constructivism” (Powell 2009, p. 241).
Regardless of the many competing adjectives married to *constructivism*, there is a common theme running through them, which allows us to discuss this learning theory in fruitful ways. In its simplest form, constructivism involves learners in the active construction of knowledge rather than being the passive recipients of it. Powell (2009) further explains, “in cognitive constructivism, ideas are constructed in individuals through a personal process, as opposed to social constructivism where ideas are constructed through interaction with the teacher and other students” (p. 241).

**Constructivism 1.0**

Land and Hannafin (2000) report that constructivism was “widely espoused but rarely practiced in schools and classrooms in the late 1990s” (p. 11). One possible cause for the failure of constructivism to become widely practiced is rooted in the way in which constructivism was presented to educators as some textbooks of the era presented a diluted version of the theory to pre-service teachers. Vacca and Vacca’s *Content Area Reading* (1996), for example, contains a chapter entitled “Thinking with Texts and Constructing Meaning,” which suggests a constructivist foundation, but the authors do not include the word *constructivism*, nor do they refer to those scholars from whose work constructivism emerged: Dewey, Piaget, and Vygotsky. The textbook does, however, prescribe how teachers should structure collaborative learning activities such as cooperative teams, jigsaw groups, learning circles, and dyads (pp. 62 – 65). Similarly, Brandvik’s *English Teacher’s Survival Guide* (1994) fails to use the word *constructivism* in its chapter “Designing, Monitoring, and Grading Cooperative Learning Activities,” which presents collaborative learning strategies that are informed by constructivism.
Together, these texts suggest that pre-service teachers of the mid-1990s were not familiarized with constructivism as a learning theory or as a foundation for designing instruction. Vacca and Vacca (1996) and Brandvik (1994) package constructivism as cooperative learning devoid of theory. As a result, constructivism may have appeared in classrooms as sporadic activities rather than as part of comprehensive constructivist pedagogy or as an instructional design principle.

Web 2.0

Sometimes called the Read – Write Web, today’s web applications differ from Web 1.0, which primarily served as a source from which to retrieve information. In contrast, Web 2.0 invites students to participate in the creation— one might say the construction— of Web content. Merchant (2009) explains:

Web 2.0 applications pre-suppose a more active user who is encouraged to design an online presence (an identity, or even multiple identities) and to participate, to a greater or lesser extent in a community of like-minded users – as in the popular social networking site Facebook. (p. 108)

Merchant, furthermore, sees four characteristics of the Web 2.0 user (p. 109):

1. **Presence**: a recognizable online identity such as an avatar
2. **Modification**: the ability to modify online space through the uploading of images or the embedding of videos
3. **User-generated content**: the user generates content and, in doing so, contributes to community
4. **Social participation**: users rank or “like” content and create blogrolls
Thus, Web 2.0 involves users not only in the creation of an online identity, but also in the social production of content and meaning (p. 116).

**Constructivism 2.0**

Users of Web 2.0’s myriad applications, such as wikis, blogs, social networking sites, and Google Apps, have opportunities for collaborating, retrieving, remixing, and publishing digital knowledge that make possible a new generation of constructivism—constructivism 2.0—and many scholars have described its use as an evolving set of tools that engage students in the active construction of knowledge through interaction, collaboration, and production. As Heafner and Friedman (2008) state:

Web 2.0 applications . . . have the potential to shift student uses of the Internet from the static recollection of facts . . . to a scenario in which students are actively engaged in the subject matter in order to develop their own understandings, and thus become generators of knowledge as well as active contributors to the Internet. (p. 300)

Diverse Web 2.0 applications offer opportunities for the exploration and production of knowledge across the disciplines. Oliver (2010), for example, describes the possible uses of Web 2.0 tools in math, science, social studies, art, business education, foreign language, physical education and health, and music. To illustrate, he states, “teachers of English-Language Arts have one of the richest sets of Web 2.0 tools at their disposal to support language and literacy development as well as writing” (p. 52). He reports that “more than fifty Web 2.0 tools are available that allow students to practice their writing and publish their work online in divergent formats such as slideshows, timelines, comic strips and scrapbooks” (p. 52). Web 2.0 applications such as Google Apps, flickr, and Prezi provide tools for student inquiry and sharing.
Web 2.0, however, is not just about providing students with opportunities to practice and publish. It is also about participation and constructing knowledge, which wikis make possible.

Wikis are flexible tool for educators, offering an online platform for users to share ideas, engage in discussion, add links, post media, and create content. Heafner and Friedman (2008), for example, report that wikis have the potential to “restructure traditional learning environments” (p. 288). In the social studies classroom the authors studied, each student created his or her own wiki, which “enabled students to individually explore battles, images, events, and people, such as the changing role of African Americans and women” (p. 295). In addition to the individual exploration and sharing of learning, Heafner and Friedman (2008) observed additional benefits:

Wikis also mediated a more collaborative and communicative learning environment in which students initiated questions, answered peer questions, engaged the teacher in individual dialogue, and conversed with peers about their wikis both socially and as part of the final critique of the project. (p. 296)

Wikis, however, are not the only Web 2.0 tool available that make possible online exploration, collaboration, and production.

Merchant (2009) finds blogs as “the most widely known and used” of Web 2.0 applications (p. 111). Studying the use of a teacher-created blog in an elementary school classroom, he reports on the concomitant informal learning and learning through participation enjoyed by student contributors:

Although most of the learning is situated in the immediate physical location of the school, [the teacher’s] vision is of a connected world where others, outside the classroom, can contribute to the learning space she has created. In this way, it could be argued that these
young [students] are apprenticed to a participatory culture – a culture that connects its members in new and potentially powerful ways. . . . The children themselves draw on different funds of knowledge and help each other, older pupils act as buddies, and visitors to the blog contribute, too. In sum, these students are using new literacies to participate in a digitally mediated culture as they become involved in online communicative interaction in a shared space related to a joint endeavour. (p. 112)

Blogs, similarly to wikis, allow students to participate in and contribute to the digital discourse of the twenty-first century.

Also seeking to provide students with online tools with which to “converse and collaborate” and to “prepare students for the literacy demands of the 21st century,” Moorman (2009), introduced a Ning--a user-created social networking site--to her twelfth-grade students. Not only did students use the Ning to communicate with one another, they also used it to collaborate with alumni members. Each, some more than others, wrote blog posts, started discussions, and contributed to others’ discussions. Those students who embraced the technology, reported on their comfort writing for school in a format that resembled their familiar Facebook pages. Moorman, therefore, was able to bridge students’ out-of-school literacy with school literacy. One student reported “‘it helped me practice better writing—writing that I would want a lot of people to read, because I’m proofreading more carefully and using language that I don’t use every day’” (p. 5).

Despite the desire of some educators to engage their students in using blogs, wikis, and other collaborative tools, Merchant (2009) cautions us:

As formal education begins to appropriate and repurpose Web 2.0 technologies, . . . there is a need to re-examine pedagogical principles and ask ourselves whether we imagine that
these technologies will perform old routines more effectively, or whether they really can be transformational, and, if so, how. (p. 107).

He finds that “Despite claims that the social web is a rich space for informal learning, to date there has been little serious attention paid to the form or nature of that learning” (p. 109).

Today’s students use the web for diverse purposes and with wide-ranging levels of skill. Moving beyond wikis, blogs, and Nings, Luckin et al (2009) studied the use of Web 2.0 technologies by 2,611 students representing grades eight and ten in 27 United Kingdom schools (p.89). They found that 74 percent of students report using a social networking site (p. 90), such as myspace, and 90 percent of students used email (p. 91). In contrast, only two students reported editing a wiki page (p. 91), and “blogging was not a particularly popular activity” (p. 91).

Luckin et al (2009) found limited evidence for the widespread use of Web 2.0 applications as a learning tool. They identified four types of student users, each with varying degrees of proficiency:

1. **Researchers**: learners “who commonly refers to online resources as a means of retrieving information and/or extending their knowledge base,” and they show “little evidence of critical enquiry or analytical awareness” (p. 94). Researchers continue to regard the Web as in its 1.0 incarnation--a source for information--rather than as a forum for exchanging ideas and creating knowledge, and they have not developed an online presence.

2. **Collaborators**: use “online networks and technologies to work together with others, whether they be peers, teachers or other ‘experts’” (p. 96). Collaborators, however, show little “collaborative knowledge construction” (p. 94). Collaborators use the Web
to communicate with others, primarily via email. While they may have begun to establish an online presence, they are yet to use the web to connect ideas or publish knowledge.

3. **Producers** and 4. **Publishers**: learners who share “experience through social networking sites” (p. 94). Both producers and publishers have created an online identity, and they show some evidence of “coproduction and publishing” (p. 94).

Luckin et al’s four types of student users have implications for constructivism 2.0. None of the four groups demonstrates a high degree of proficiency with collaborating to generate knowledge, and few have experience using web applications for creating and sharing new knowledge. It, therefore, ought to be the goal of today’s constructivist educators to move students to higher degrees of Web 2.0 proficiency and engage all in authentic online discourse that includes exploration, evaluation, collaboration, synthesis, production, and publishing.

Several institutional and social conditions are likely to lead to effective learning through Web 2.0 applications. While participation—sharing, debating, and synthesizing—is required for constructivism to be successful, Merchant (2009) sees five essential conditions for student participation to be effective:

1. “low barriers to artistic and civic engagement” (p. 114)
2. “strong support for creating and sharing one’s creations with others” (p. 114)
3. “some type of informal mentorship whereby what is known by the most experienced is passed along to novices,”
4. “members believe their contribution matters” (p. 114)
5. “members feel some degree of social connection with one another” (p. 115).
Just as the successful integration of Web 2.0 applications hinges on the cultural conditions of the learning environment, effective learning activities share several characteristics.

Neo (2005) presents a helpful six-element schema for educators hoping to effectively marry technology with constructivism:

1. Present students with a web-based problem.
2. Allow students to acquire prerequisite knowledge.
3. Allow students use of web-based authoring tools to prepare their projects.
4. Assign students to teams to construct knowledge.
5. Guide students as they develop their project.
6. Allow students to present their learning (p. 9).

The instructor, as is typical in constructivist classrooms, serves as a facilitator, and multimedia provides a “constructivist learning tool” (p. 9). After completing such a learning activity, students reported “I even found it better compared to individual work because we really got to learn a lot among ourselves” and “I learnt from my mistakes and learned to judge my own work from other people’s view” (p. 12).

*(De)constructing Consequences*

While the use of Web 2.0 by constructivist educators appears beneficial, with students learning through collaboration and interaction, scholars have reported unintended consequences and raise concerns for classroom implementation. Heafner and Friedman (2008), for example, write, “despite qualitative data that show creating a wiki resulted in greater student engagement, motivation, and interest in social studies” (p. 297), the same students underperformed on end-of-course assessments that used multiple-choice questions. In this instance, learning and
assessment were not aligned. Merchant (2009) similarly sees a conflict between traditional education and constructivism:

As long as formal education remains focused on inculcating children and young people into pre-existing, print-based practices and hierarchically organized forms of knowledge that are somehow to be transferred to individual learners, a genuinely participatory approach will be hard to achieve. (p. 117)

For constructivism 2.0 to be effective, technology, theory, instruction, and assessment must work in concert.

Educators must also communicate expectations and performance standards to students. Moorman (2009), for instance, observed that students did not equally contribute to their class Ning. After interviewing students, she concluded that the Ning was competing with Facebook for students’ attention. One student reported that it took “dedication” to call up and contribute to the Ning (p. 4). Lastly, Luckin et al (2009) speculate that “the lack of synchronous communication means that social networking sites may not be ideal arenas through which to conduct collaborative learning. Additionally, some learners viewed the online social space as an important respite from school” (p. 97).

Conclusion

“Participation,” writes Merchant (2009) “as a word in everyday use, evokes ideas of sharing and working together. It stresses collaborative or collective experience” (p. 119). If, as constructivists posit, knowledge is built through participation, sharing, and collaborating, Web 2.0, with its interactive nature, provides a new forum through which to engage learners in the social creation of knowledge. Constructivism 2.0 is more than “social constructivism where ideas are constructed through interaction with the teacher and other students” (Powell, 2009, p.
It is Web-enriched learning that affords greater exploration of the world, powerful forums for collaborating near and far with others, and for publishing the products of students’ learning.
References


**Assessment Rubric for Final Synthesis Papers**

**198/200**

**Content**

16 pts x2 = 32

The paper is exceptionally focused on some aspect of learning theory and makes a clear connection to educational technology.

The paper is focused on some aspect of learning theory and educational technology.

The paper lacks focus. The learning theory may be irrelevant or missing and/or there may or may not be a connection to educational technology.

This paper is missing a discussion on learning theory or educational technology. The information may be incorrect.
Structure & Clarity
16 pts x2 - 32

The points made in the paper flow together in a coherent and logical manner. It is very well structured and easy to follow. The paper is easy to read and understandable.

The points made in the paper are generally structured well, but there are occasional lapses or jumps in the flow of the writing. Overall, the paper is understandable.

The points made in the paper are loosely structured and it is somewhat confusing to read. There are noticeable gaps in the flow of the writing. Portions of the paper are understandable.

The paper is confusing and it is nearly impossible to understand how everything fits together. The paper meanders hopelessly leaving the reader completely lost.

Research Focus
16 pts x2 = 32

The research focus fits within an organized taxonomy and is meaningful and relevant to the discussion.

The research focus fits within an organized taxonomy and is somewhat meaningful and relevant to the discussion.

The research focus is somewhat organized but lacks relevance to the discussion.

The research focus in disorganized and lacks relevance to the discussion.

Literature Cited
16 pts x2 = 32

All citations are from peer-reviewed journal articles or includes one or two non-peer reviewed citations but they are from credible sources.

Includes one or two non-peer reviewed citations non credible sources.

Includes three or more non-peer reviewed citations from non credible sources.

Includes no peer-reviewed citations.

APA Style and Formatting
16 pts x2 = 30

References, citations, etc.

References are cited in APA style with no errors. Paper follows APA guidelines.
APA style errors occur one to three times in citations. Paper follows APA guidelines.

APA style errors occur four to six times in citations or paper does not follow APA guidelines.

APA style errors occur more than four times in citations and paper does not follow APA guidelines.

**Organization**

12 pts $\times 2 = 24$

The paper is organized with a title and appropriate introduction.

The paper is somewhat organized with a title and appropriate introduction.

The paper is somewhat organized but missing the title and/or introduction.

This paper has no organizational structure.

**Length**

8 pts $\times 2 = 16$

2500 - 3000 words.
*This count does not include references.*

2000-2500 words or 3000 - 3500 words.
*This count does not include references or abstract.*

1500 - 2000 words or 3500 - 4000 words.
*This count does not include references or abstract.*

Less than 1500 or greater than 4000 words.
*This count does not include reference or abstract.*