Harnessing the affordances of Web 2.0 and social software tools: Can we finally make “student-centered” learning a reality?

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Abstract: This paper highlights the importance of considering the educational affordances of information and communication technologies (ICTs), in particular the raft of new and emerging Web 2.0 and social software tools that offer rich opportunities for collaboration, interactivity, and socio-experiential learning. The authors argue that perceived affordances, which are a function of individual users’ or learners’ perceptions and views, are of central significance, and encourage educators to empower learners with freedom and autonomy to select and personalize the tools and technology available to them, as well as allowing them to determine how best to use the technology to support their learning. While “student-centered” learning has become somewhat of a mantra for educators in recent decades, the adoption of social software tools driven by appropriate pedagogies may offer an opportunity for this goal to be truly realized.

Introduction: The affordances of ICTs for education

The term “affordances” is generally attributed to the perceptual psychologist, J. J. Gibson (1977, 1979), who used it as a core component of his ecological theory of human perception. The term is now used in a range of fields, including but not limited to cognitive psychology, industrial design, human-computer interaction (HCI) and interface design, and artificial intelligence. Overall, an affordance is an action that an individual can potentially perform in their environment by using a particular tool (Affordance, 2007). In other words, an affordance is a “can do” statement that is not necessarily pre-defined by a particular functionality, and refers to any application that enables a user to undertake tasks in their environment. For example, telephones allow the placing and receiving of calls, which in isolation are not affordances, but which substantively enable the affordances of communication and information exchange.

Salomon (1993) advocates analyzing information and communication technologies (ICTs) from the perspective of their educational affordances. According to Kirschner (2002), educational affordances can be defined as the relationships between the properties of an educational intervention and the characteristics of the learner that enable certain kinds of learning to take place. Conole and Dyke (2004) draw on social and educational theory to propose a taxonomy of the educational affordances of ICTs, which include the identified themes of: accessibility, speed of change; diversity; communication and collaboration; reflection; multimodal and non-linear learning; risk, fragility, and uncertainty; immediacy, monopolization, and surveillance. They believe that the taxonomy will be useful as a “checklist” for practitioners, to assist them in making informed decisions about the use of different ICT technologies, and also to help increase their awareness of the properties of different tools and resources. This awareness will be beneficial as they design and develop learning activities and teaching plans.

In this paper, the authors first discuss the affordances of the new wave of social software tools that are beginning to pervade our classrooms and institutions. They then argue for a broader view of affordances that recognizes the central role of the user or learner in determining the possibilities and uses of the technologies available, before using
this as a starting point to discuss the potential—and need—for truly student-centered learning to come to fruition in a Web 2.0 era.

Web 2.0 and social software tools and their affordances

“Web 2.0” refers to an apparent second generation or improved form of the World Wide Web that emphasizes collaboration and sharing of knowledge and content among users. While Web 2.0 does not entail radical changes in the technical specifications of the Web, most proponents of the concept describe it in terms of new possibilities and applications. O’Reilly (O’Reilly 2005a, 2005b) believes that these new applications have emerged due to a changing socio-cultural context, giving rise to the perception of revolutionary new uses for the same technologies.

Characteristic of Web 2.0 are the socially-based tools and systems referred to collectively as social software, which includes but is not limited to web logs (blogs), wikis, Really Simple Syndication (RSS) and podcasting feeds, peer-to-peer (P2P) media sharing applications, and social bookmarking utilities. These new tools make possible a new wave of online behavior, distributed collaboration, and social interaction, and are already having a transformative effect on society, triggering changes in how we communicate and learn. A few examples will illustrate the new forms of communication and participation enabled by social software tools. Users are now engaged in creative authorship by being able to produce and manipulate digital images and video clips, tag them with chosen keywords, and make this content available to their friends and peers worldwide through Flickr, MySpace, and YouTube. Other individuals write blogs and create wiki spaces where like-minded individuals comment on, share, and augment these sources, thereby engaging in a new genre of dynamic “personal publishing” (Downes, 2004).

Advocates of Web 2.0 assert that the terms “co-creation” and “users add value” encapsulate the practices of those who participate in and use social software, showing that that is not just an assembly of tools, but a set of concepts, practices, and attitudes that define its scope. This can be exemplified by contrasting two sites, Encyclopædia Britannica Online (2007) and Wikipedia (2007), the former maintained by a commercial organization and the latter by an open community. In Wikipedia, users can participate and create content, and in doing so become “prosumers” (both consumers and producers). This openness is the characteristic hallmark of Web 2.0, in which users mix, amend, and recombine content, collaboratively and open to a global audience, inviting revision and commentary. Moreover, the added dimension of scale means that the more people using the tools, the greater the network effect. The combined efforts and collective intelligence of hundreds of individuals can result in the co-production of resources such as Wikipedia entries, illustrating the power of the “wisdom of crowds” (Surowiecki, 2004). The “wisdom of crowds” concept acknowledges that when working cooperatively and sharing ideas, communities can be significantly more productive than individuals working in isolation. It is this “architecture of participation” (Barsky & Purdon, 2006, p. 65) that ensures that Web 2.0 is continually responsive to users.

So, what does Web 2.0 mean for education? The advent of this new wave of tools and technologies provokes us to consider the implications for and potential applications to formal spaces of learning in colleges and universities (Berg, Berquam, & Christoph 2007). Social software applications can also be viewed as pedagogical tools that stem from their affordances of information discovery and sharing. Anderson (2004) observes that: “The greatest affordance of the Web for educational use is the profound and multifaceted increase in communication and interaction capability” (p. 42), which is even more evident in Web 2.0 when compared to the set of linked information sources that characterized “Web 1.0.” Drawing on extant Web 2.0 research and practice, some examples of the affordances of Web 2.0 and social software tools are as follows:

- **Connectivity and social rapport.** Social networking sites like MySpace, Facebook, Ning, and Friendster attract and support networks of people and facilitate connections between them. They are representative of what Gee (2004) calls affinity spaces, in which people acquire both social and communicative skills, and at the same time become engaged in the architecture of participation of Web 2.0. In these spaces, users engage in informal learning, and creative, expressive forms of behavior and identity seeking, while developing a range of digital literacies.

- **Collaborative information discovery and sharing.** Data sharing is enabled through a range of software applications, and experts and novices alike can make their work available to the rest of the virtual world, for example through personal and collaborative blogs. Social bookmarking tools such as del.icio.us, Furl,
and Digg allow people to build up collections of web resources or bookmarks, classify and organize them through the use of metadata tags, and share both the bookmarks and tags with others. In this way, users with similar interests can learn from one another through subscribing to the bookmarks and tags of others, and actively contribute to the ongoing growth and evolution of the “folksonomy” of web-based information and knowledge.

- **Content creation.** Web 2.0 emphasizes the pre-eminence of content creation over content consumption. Anyone can create, assemble, organize, and share content to meet their own needs and those of others. Open source and open content (cf. Massachusetts Institute of Technology, 2007; *MERLOT*, 2006; Beshears, 2005) initiatives, as well as copyright licensing models like Creative Commons (2007), are helping fuel the growth of user-generated content. Wikis enable teams and individuals to work together to generate new knowledge through an open editing and review structure.

- **Knowledge and information aggregation and content modification.** The large uptake of RSS, as well as related technologies such as podcasting (Curry, 2004) and vodcasting (which involve the syndication and aggregation of audio and video content, respectively), is indicative of a move to collecting material from many sources and using it for personal needs. Hilton (2006) describes these technologies as part of a move from “producer push” to “demand pull,” whereby students are now accustomed to obtaining and consuming content “on demand.” There is also a trend towards the unbundling of content (Hilton, 2006), and the rise of “micro-content” (Spivack, 2003; Dash, 2002; Lindner, 2005, 2006; Leene, 2005; Haque, 2005), or digital content in small fragments that are loosely connected, and which can be re-mixed and re-formulated by individuals to produce new patterns, images, and interpretations (see also Mejias, 2005; Weinberger, 2002). (This is representative of the concept of a the concept of a “mash-up.”)

These affordances stimulate the development of a participatory culture in which there is genuine engagement and communication, and in which members feel socially connected with one another. Having said this, one cannot assume that just because Web 2.0 provides such affordances, these will automatically translate into effective learning outcomes. Careful planning and a thorough understanding of the dynamics of these affordances are necessary. It is also imperative to acknowledge that technologies are intricately related to many other elements of the learning context (such as task design) that can shape the possibilities they offer to learners, and the extent to which learning outcomes can be realized. In addition, the deployment of educational technologies must be underpinned by an explicit learning paradigm and informed by pedagogical principles that place learners at the center of the learning process (Joyes, 2005/6; Salaberry, 2001).

### Affordances and student perceptions of their relevance to learning

In Gibson’s (1977, 1979) theory of affordances, he adopted a definition of affordances that considered them to be the set of all latent “action possibilities” that are objectively measurable, irrespective of whether these are known to the individual. Gibson's definition remains the prevalent one in the area of cognitive psychology. Gibson’s work was adapted to the design of everyday objects by Norman (1988). In his initial work, Norman combined the concept of affordances inherent in an object with the idea of perceived affordances; in later work, however, he clarified the distinction between “real” and “perceived” affordances, noting that “the perceived affordances are what determine usability” (Norman, 1998, pp. 123-4).

In contrast to Gibson, Norman (1998) linked affordances closely with the mental and perceptual capabilities of the observer, and highlighted the centrality of this view to interaction design and usability. Similarly, in considering the educational affordances of Web 2.0, social software, and other ICT tools for learning, it is necessary to acknowledge that these affordances are ultimately dependent on the views and perceptions of users (learners). In other words, how learners perceive the possibilities of the tools and their “ideal” use(s) in the context of their learning may be markedly different to the ideas and intentions of the educators and educational technologists who design them. Failing to recognize and reconcile these discrepancies can lead to de-motivation, boredom, and confusion among learners (Dron, 2006). Recent research on the learner perceptions of how social software tools (such as podcasting) support learning are encouraging, although more empirical research is needed to create a substantial evidence base (Lee, McLoughlin, & Chan, 2007; McLoughlin & Lee, 2007).
Learner control in learning management systems and social software

The centrality of perceived affordances, or the view of affordances as perceived action possibilities, leads us to a consideration of the importance of learner control and agency in the Web 2.0 era (Dron, 2007a, 2007b). Traditional approaches to teaching and learning are often based on pre-packaged learning materials, fixed deadlines and assessment tasks designed and stipulated by teachers. However, recent research attests to a growing appreciation of the learner’s control over the whole learning process. Evidence suggests that we can improve learning effectiveness by giving the learner control over, and responsibility for their own learning. This is the foundation for such teaching approaches as problem-based and inquiry-based learning (Desharnais & Limson 2007; Edelson, Gordin & Pea, 1999).

Moreover, the reality is that today’s students are now exerting greater control over the consumption and creation of the content found online. The Pew Internet & American Life Project reports that approximately 50% of all teens in the United States, which equates to 12 million youth, not only participate in online activities but also create their own online content through blogs, personal Web pages, and remixing (Lenhart & Madden, 2005). Students, as members of the open culture of Web 2.0, are finding new ways to contribute, communicate, and collaborate, using a variety of accessible and easy to use tools that empower them to develop and share ideas. The most popular and fastest growing Web sites on the Internet (e.g., YouTube and MySpace) are all capitalizing on this generativity, placing the power of media creation and distribution into the hands of “the people formerly known as the audience” (Rosen, 2006).

This is highly incongruent with the control culture of education, where pre-packaged content and teacher-designed syllabi dominate. Although the current generation of learning management systems (LMS’s) prevalent in universities and colleges allows each student to have their personal view of the courses they are enrolled in, many do not accommodate the social connectivity tools and personal profile spaces that students might choose. Siemens (2006, p. 16) cautions that “As learners move beyond content consumption and into stages of critical thinking, collaboration, and content creation, LMS weaknesses become apparent.” Many LMS’s replicate traditional models of learning and teaching in online environments. They conform to a classroom or lecture hall metaphor, which the authors of the present article believe can have a severely limiting, if not detrimental, effect on learning in the Web 2.0 era:

"Thanks to the wonders of modern information and communications technologies, we have already managed to overcome the confines of the physical classroom, but today still remain unknowing prisoners of the instructor-centred online classroom. To move further ahead, we will need to demolish these virtual walls so as to create social learning spaces, in which learners and … [teachers] … become associates in a community of practice, participating in networks of interaction that transcend the old-fashioned constructs of institutions and organizations (Lee, 2005, p. 17)."

The persistence of the virtual walls of the instructor-centered online classroom may explain, at least in part, why we “can’t … stop lecturing online” (Sheely, 2006), and why learning tasks continue to be dominated by instructor-generated learning objects that cast students into the role of information consumer. While many LMS’s purport to facilitate Web 2.0-based e-learning by virtue of the fact that they allow the integration of tools such as blogs and wikis, these are typically housed within a “caged user interface” (Eustace, 2006) or “walled garden” in the “safe” confines of the institution’s systems and networks. As such, these applications are largely incongruent with the Web 2.0 philosophy and ethos. Online learning environments continue to be firmly set in frameworks and decisions made by teachers, administrators, and instructional designers, who retain complete control over the tools available and constrain the ways in which they can be used by learners to support their learning (Dron, 2007a).

Web 2.0 and its constituent social software tools offer much potential to allow us to finally move away from the highly-centralized industrial model of learning of the past decade, towards achieving individual empowerment of learners through designs that focus on collaborative, networked communication and interaction (Rogers, Liddle, Chan, Doxey, & Isom, 2007; Sims, 2006). Educators and institutions are now faced with a imperative: leverage this potential to place the student at center of the learning process, otherwise risk being left behind, or worse still, suffer the consequences of increased attrition rates and decreasing funding as the members of an increasingly well-informed student cohort protest and may even withdraw. In the words of Barnes and Tynan (2005): “Most
undergraduates now expect the same level of service from university administrations that they receive from their ISP or mobile phone provider. If they are not happy with a provider, they switch” (p. 197).

However, new tools and technologies are capable of supporting and encouraging informal conversation, dialogue, collaborative content generation, and the sharing of knowledge, facilitating access to a wide raft of ideas and representations (McLoughlin & Lee, 2007). Used appropriately, they can shift control to the learner, through promoting learner agency, autonomy, and engagement in social networks that straddle multiple real and virtual communities independent of physical, geographic, institutional, and organizational boundaries. In order for this to come to fruition, however, students need to be able to choose and personalize not only what tools and content are available, but also the ways in which they are used to support their learning. Educators cannot and must not pre-empt learners or dictate how they should use technologies, nor should they be confined to “closed” environments, whether real or virtual.

Downes (2005) describes a learning environment as an approach, not an application, one that protects and celebrates identity, supports multiple levels of socializing, and encourages the development of communities of inquiry. He argues for Personal Learning Environments (PLE’s), in which learners manage their own learning by selecting, integrating, and using various software tools and services. A PLE provides contextually appropriate toolsets by enabling individuals to adjust and choose options based on their needs and circumstances, resulting in (ideally) a model where learner needs, rather than technology, drive the learning process. There are signs of optimism that the social software tools will bring about learning environments that are more personal, collaborative and participatory:

Like the web itself, the early promise of e-learning - that of empowerment - has not been fully realised. The experience of e-learning for many has been no more than a hand-out published online, coupled with a simple multiple-choice quiz. Hardly inspiring, let alone empowering. But by using these new web services, e-learning has the potential to become far more personal, social and flexible. (O’Hear, 2005, Introduction, para. 3)

Conclusion

The requirement for learning to be “student-centered” has been widely acknowledged and recognized for many decades. Unfortunately, however, there continue to be significant gaps in teachers’ espoused and enacted pedagogies. In the Web 2.0 era, the need to close these gaps to achieve truly student-centered learning is paramount, as learners, more so than ever before, demand a high degree of autonomy, connectivity, and socio-experiential learning. Fortunately, Web 2.0 also equips us with the necessary tools and capabilities to meet this challenge, which we must carefully consider and analyze from the point of view of their specific educational affordances, especially as they are viewed and perceived by learners.

The need for personalization of learning resources and learning environments must be taken a step further. Of crucial importance to attaining the longstanding goal of student-centered learning is the need to realize that learner needs and preferences cannot be addressed as static constructs, during the design and development phases of the instructional design process. To endeavor to do this would be a case of attempting to “design the undesignable” (Dron, 2007b). Rather, educators must be prepared to accept and face the reality that learners’ needs, preferences, perceptions, and mental models will be alive, dynamic and diverse. These are dependent on myriad factors and variables including but not limited to the learner’s background and past experiences, and will also inevitably continue to change in unpredictable ways throughout the course of a learning intervention. Educators must be willing to relinquish some degree of control, in favor of empowering learners with the flexibility and autonomy to choose the sets of technologies and tools available to them, and to negotiate with learners the ways in which they will make use of these tools, so that students are given the power to shape their personal learning trajectories as they progress through higher education.

The real challenge for educators is to promote learner control, self-direction, agency and autonomy by offering flexible options and choice, while still supplying the necessary structure and scaffolding, and adding value to the learning process in an education climate where the value of textbooks is being questioned (Fink, 2005; Moore, 2003), and where the open source and open content movements are attracting high levels of attention and traction. In conclusion, the authors believe that social networking technologies – including that are part of Web 2.0 and beyond,
are best used to supply support and scaffolding for learning and reflection within authentic, real world contexts. A range of learner-centered pedagogies (such as inquiry and problem-based learning) should afford students a true sense of agency, control, and ownership of the learning experience, and the capacity to create, share, and communicate ideas and knowledge. To deliver such an entitlement, we need to leverage the social software tools to extend and transform current practices, while keeping learners and the social dimensions of learning at the forefront.

References


