User Generated Design: Teaching and Learning with Web 2.0

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Abstract

The Web 2.0 Instructional Design Model has been designed to guide users to utilize Web 2.0 tools to improve learning and performance. Web 2.0 ID is built upon the socio-constructivist philosophies of learning and emphasizes on three dimensions to designing learning for the Web 2.0 environment – social/collaborative, learner as the designer and knowledge management. The chapter explains the three phases of the model in detail 1) the analysis phase where the learner as the designer interacts with a facilitator to analyze the learning that has to happen, 2) the design phase where the learners collaborate and personalize their learning, 3) and finally the evaluation phase where the learners interact with the facilitator who helps them evaluate the learning that has occurred. Several Web 2.0 tools that help in this collaboration/personalization phase are described. Two case studies where the Web 2.0 model has been applied in a classroom setting have also been described.

Introduction

Advancements in technology have revolutionized the opportunities for educators to teach and the means for students to learn. In the last decade, educational opportunities have evolved within the movement towards Web-based instruction, online learning, and even more dramatically with the combination of social learning, inquiry-based interactive learning, and knowledge construction. The contention exists that the nature of knowledge and learning themselves has changed (Siemens, 2004). The pedagogical methods used for years are instructionally sound and defendable, but they can quickly become outdated as students adapt their learning to the networked world.

The recent emergence of approaches to learning that are based on self-determination and networked contexts such as heutagogy (Phelps, Hase, & Ellis, 2005) and connectivism (Siemens, 2005) help us understand learning as making connections with ideas, facts, people and communities. Learning has grown beyond mere consumption of knowledge and become a knowledge creation process. In the current world of proliferated mass social media, it is Web 2.0 tools that provide an excellent vehicle for making such connections. The question becomes what can we do to promote effective learning using Web 2.0 tools.

The authors of this chapter have designed an instructional model that can be used to guide users to utilize Web 2.0 tools to improve learning and performance. Web 2.0 instructional design (Web 2.0 ID) provides both a new model for teaching that builds upon the inherent capacity of networked communication to support improvement in learning and performance, and a new model of learning where learners engage in the process of design that supports individual and collective learning with Web 2.0 tools. Learning with the Web 2.0 platform is learner driven rather than instructor driven. These tools are ready when needed by the learner. Learning in this new paradigm stems from innovation rather than instruction.

The Conceptual Framework of the Web 2.0 Instructional Design Model (Background)

Web 2.0 ID is built upon the notion that learning is no longer an internal, individualistic activity, and that learner-designed contexts have the capacity to connect the formal learning agenda of educational institutions with the personal learning goals of students.

Drawing from socio-constructivist philosophies of learning such as: social learning theory (Vygotsky, 1978) and Social Construction of Technology (SCOT) (Bijker, Pinch, & Hughes, 1987; Collins, 1985; & Woolgar, 1991); Web 2.0 ID approaches learning as grounded in the theories of distributed cognition (Salomon, 1993), and social construction of knowledge (Glasersfeld, 1995).Web 2.0 places all participants in learning at the intersection of these two theories, in that, the social context and distributed environment are now one in the same.

Web 2.0 ID was developed to allow for flexibility along and within the continuum of teacher-directed pedagogy to learner-directed heutagogy. Garrison, Anderson, and Archer (2003) identify social presence, cognitive presence, and teaching presence as the conditions for developing an online learning community. Web 2.0 ID reflects our assertion that teaching presence may be established anywhere along the pedagogy-heutagogy continuum. This assertion dictates that the design model must provide for co-configuration, co-creation, or co-design of learning (Bakardjieva, 2005). McLoughlin (2002) provides a framework for designing learner support for an online environment, which includes task support, social support, and peer support. Tait and Mills (2003) indicate support systems must relate to different cultures, learners, economic systems, and programs of study.

Web 2.0 tools make it possible for social connections to be made easily. Participants are able to collaborate based on a learning/performance outcome and look for peers and experts to guide them through the process.

Dimensions of Web 2.0 ID (Focus)

Web 2.0 ID applies three dimensions of learner and technological characteristics to designing learning for the Web 2.0 environment.

Collaborative/Social. Web 2.0 ID is collaborative. Collaborative learning environments offer a new perspective on the importance of creating a supportive context within which learners can navigate the process of learning, self-regulate, collaborate, and contribute (Gunawardena & McIsaac, 2004; Strijbos, Martens, & Jochems, 2004). Unlike early models of independent study that stressed individual learning, Web 2.0 ID provides the framework for learners to design, interact, receive feedback, and construct their own learning at various levels of self-determination while contributing to a social community.

We believe that to successfully achieve such a self-regulating community requires an investment by the instructor. The teacher serves as the facilitator allowing students to inquire, research, discover, analyze, and evaluate according to their needs and what is being studied. The emphasis shifts from giver of knowledge to one who supports, encourages, challenges, questions, and promotes intellectual curiosity with the learner being held responsible for what is accomplished (Cooper, 2003).

User Generated Design. As designers, learners have the opportunity to use Web 2.0 tools, to creatively accumulate knowledge based on their interest, and build on meaningful information aligned with the intended outcomes.

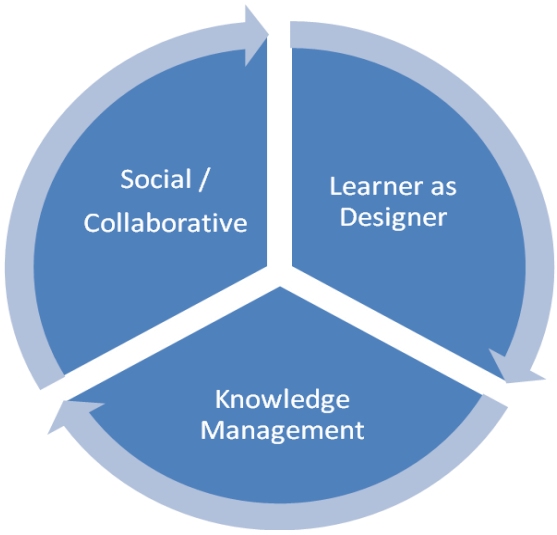

Figure 1. Dimensions of Web 2.0 ID

In the learner as designer phase, learners become intellectual partners with the technology and engage in constructive learning processes (Salomon, Perkins & Globerson, 1989; Bhattacharya & Bhattacharya, 2006). The model involves the learners in the intellectual process of building their knowledge rather than isolating them from the process.

Knowledge Management. Knowledge Management is an approach to achieving learning and performance objectives by efficient use of knowledge. In Web 2.0 ID, we rely on intelligence-based knowledge management, which is a composite construct of data, information, rules, procedures, best practices and traits such as attention, motivation, creativity, commitment and innovation (Malhotra, 2003).

In the learner as designer phase, social Web users collaborate towards their learning and performance outcome. This paradigm represents a change from the days when users preferred to keep the knowledge locked and users were concerned about copyright, privacy and secrecy. Web 2.0 ID is build about users that are willing to share their knowledge across boundaries as long as it is valued and beneficial. Users personalize the knowledge gained by reflecting and actualizing it towards their outcome. Finally, they also receive feedback on their understanding and provide feedback to the other users within the Web 2.0 environment. This cycle results in a continuous collaboration towards the learning/performance outcome, and the reinforcement of intrinsically and extrinsically motivated Web 2.0 learners.

Figure 2. Intelligence Based Knowledge Management

The technological capabilities of the Web 2.0 platform support the computational aspects of knowledge management, and the social collaborative aspect provide an opportunity for the re-use of knowledge in an efficient manner. Web 2.0 ID utilizes the co-identity of the social context, the paradigm of intelligence-based knowledge management, and the distributed environments, to not only center the final outcome about the learner, but the design process as well. Web 2.0 ID is built around a leaner design cycle based on continuous collaboration and performance improvement (Stokes & Richey, 2000), which capitalizes on the duality of Web 2.0 as both the social context and distributed environment.

Phases of Web 2.0 ID

The model has been designed such that it can be adapted into a face-to-face, blended or an online classroom. Instructors may direct students to the Web 2.0 world to achieve learning objectives, or learners may use it to achieve their own learning objective.

Analysis

In an attempt to improve pedagogy, the analysis phase is designed such that the learners work with a facilitator who sets the stage for learning. This facilitator could be a peer, an instructor, or learners can self-facilitate. With guidance from the facilitator, the participants are able to analyze the tools available, identify the strengths and weaknesses of these tools and identify the learning outcomes that can be achieved using these tools. In this critical step, the learner navigates a process whereby multiple perspectives are challenged, accommodated, and negotiated with peer learners and experts. The intent of which is to solve a problem, discover something, or to work together to achieve a common learning goal.

Identify learning/performance outcomes (Outcome Analysis). The purpose of the analysis phase is to guide the learners towards the design phase with an accomplishable learning outcome that promotes collaboration and ongoing formative assessment. This is driven by the identification of a learning outcome. The phases of a formal linear analysis are transferred to the learner in the design phase.

For the instructor, purposive design in this step must include the understanding that the extent to which the performance outcome is individually or collaboratively designed exerts an impact on the remaining process. This outcome then dictates the parameters for the design and instruction. On one end of the continuum, the task analysis approach an instructional designer will use depends on the context that surrounds the instruction to be developed. Instructional designers are to have a clear understanding of what learners are to be able to accomplish by participating in instruction. At the other end, the unintentional experiences of the learners are as important if not more so than the planned outcome.

Identifying the learning/performance outcome encompasses the following tasks:

Devising an authentic task – The source of the outcome may be derived from a number of sources, be that a curricular requirement, instructor preference, learner negotiated content, or a desired outcome a learner brings to the formal classroom. Obviously, when learners assume the designer role, they lack the expertise to clearly understand what the outcome will look like, and for novices, what designing will look like. So, an indirect consequence of the process is the learner learning to learn. Identifying an open-ended, authentic performance outcome (problem-based or project-based) will allow learners to optimize the collaborative experience.

Identify strengths, weaknesses, opportunities, and threats (SWOT) posed by various Web 2.0 tools (Tool Analysis) - Using the correct tools and technology is important in attaining the learning or performance outcome. Understanding the technology is the focus of the tool analysis. SWOT Analysis is a powerful technique for understanding the strengths and weaknesses, and for looking the opportunities and threats you face on using the tools. SWOT analysis is an industrial technique to uncover opportunities, understand weaknesses, and eliminate threats that would otherwise catch you unaware. In this task, the capabilities of the available technologies must be evaluated in light of the capability to support the learning/performance task in an open-ended learning environment.

Identify users' technical competencies (Actual Competency Analysis) - Assuring the performance task is appropriate to the learners' current technical capacity may require a pre-assessment of learner skills. The technology may provide the necessary capabilities to support acquisition of the identified outcomes, but the learners must have the competency to participate.

Identify cultural and ethical values aligned with the use of the tools (Value Analysis) - Web 2.0 platforms rely on user-generated content to aggregate attention and community. Having the freedom to access content and collaborate should not bring unethical behaviors. Learners moving to design must proceed toward an outcome that does not compromise values. The level of ethical identity and individuals' perception of member empowerment created here is critical to the design and learning process. Instructors must foster: a safe environment for exchange of diverse views and multiple perspectives as the instruction moves to virtual spaces for social interaction. Instructors should address expectations that promote social equality and commitment to the learning outcome. Providing protocols for respectful communication facilitate learners moving into design with confidence.

Collaboration and Personalization

The collaboration and personalization phases comprise an iterative cycle, in which learners collaborate as their reliance on the scaffolding of the performance objective is replaced by social interaction and the achievement of a common performance goal. In this phase, learners become intellectual partners with the technology and engage in constructive learning process (Salomon, et al., 1989; Bhattacharya & Bhattacharya, 2006). The model involves the learners in the intellectual process of building their

knowledge rather than isolating them from the process. Thus promoting a mindset of constantly seeking ways to improve performance. Implicit in this focus is the sense of identifying benchmarks and constantly implementing improvements. Continuous improvement focuses on improving learning and performance to match the learning/performance outcome.

In this phase learners:

Collaborate towards their learning/performance outcome
Contribute expertise to help other participants achieve their learning outcomes
Derive knowledge from each other
Personalize the information gained
Receive and provide feedback
Continuously collaborate to improve learning/performance

Each formative cycle is punctuated by a formal formative evaluation, and concludes with a summative evaluation. Each cycle represents a formative loop that produces an assessable output to the evaluation phase. Each assessable output designates the completion of a cycle. During early cycles, learners begin to generate initial ideas to address the identified outcomes and begin to utilize the tools for establishing beneficial social interaction. During intermediate cycles, learners access relevant resources from both external sources and from peers. The role of peer feedback expands as advanced learners introduce information not considered in the initial cycles.

Self-assessment and peer-assessment lead to revision and the sharing of new perspectives. It is at this point, that commitment to the learning outcome is most challenged. Finally, learners engage in a process of reflection and reorganization that personalizes the learning process. The learners then work together to produce shared artifacts to document attainment of the learning/performance outcome of the collaborative learning experience.

Some of the Web 2.0 tools that help in this collaboration/personalization phase are described below.

Social Networking. Most of the social networking sites are Web-based and provide various techniques for interaction, such as chat, messaging, email, video, voice chat, file sharing, etc.

Though most of the social connections are established for non-education purposes, a small percentage of social connections are also established for educational purposes. Social networking can be beneficial, valuable and effective when used by students in higher education settings to collaborate on various activities towards their learning goal. Keyword searches help them connect to the other social Web users who are interested in the same learning goal as them and they are able to derive knowledge from each other. Several of the networking sites have different language capability and there are sites developed for users from specific nations.

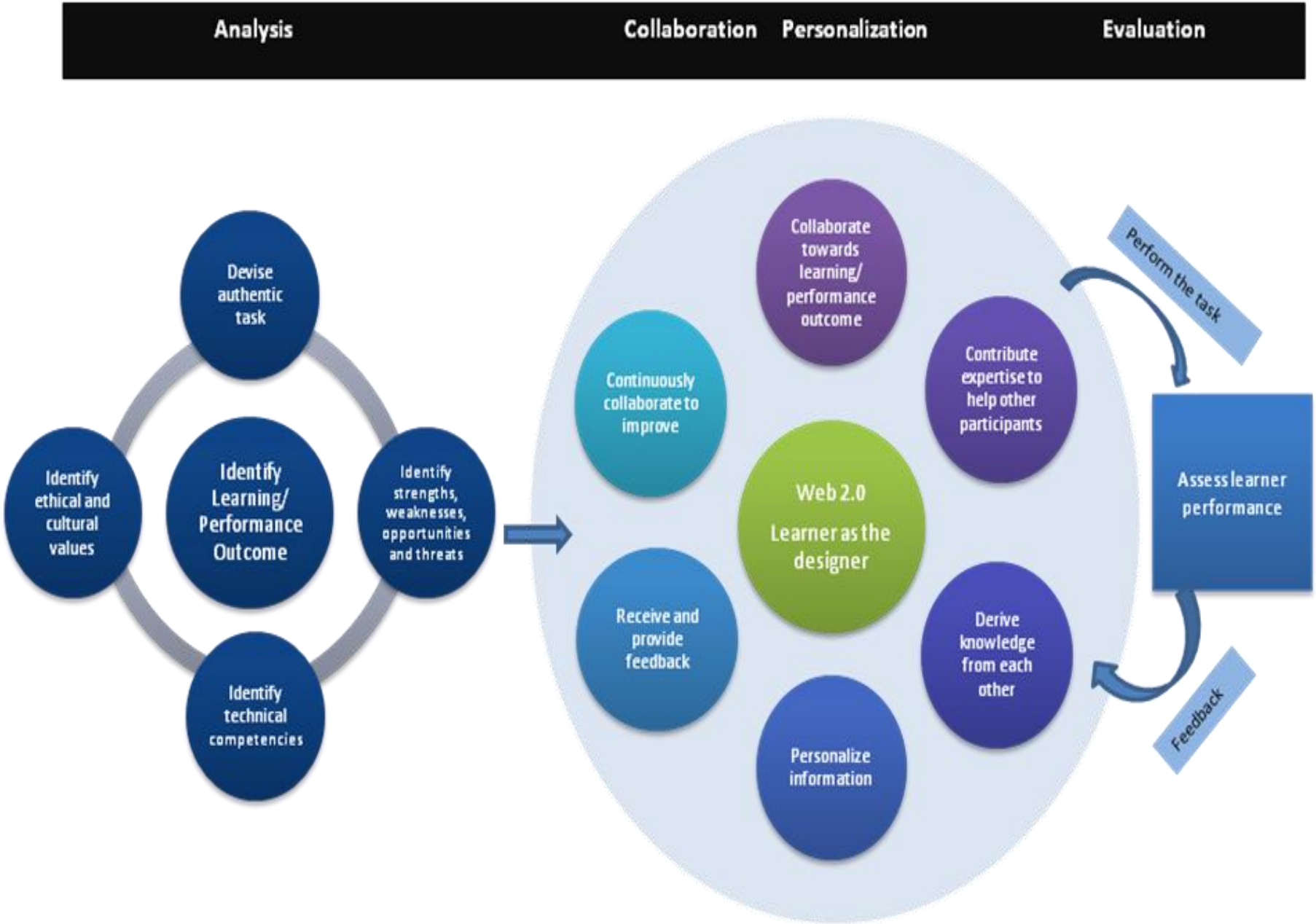

Figure 3. Web 2.0 Instructional Design Model

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Blog. A Weblog more commonly referred to as a blog, is a Web-based publication consisting primarily of periodic. The blog provides an opportunity for the blogger (one who writes the blog) to share his knowledge with the blog readers who interact with the blog poster by using the comments or email feature on the blog post. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. Though most of the blogs are online journals are used for a variety purposes, there is a category of blogs called edublogs that are written by those with an educational purpose. Edublogs include blogs written by or for teachers, blogs maintained for the purpose of classroom instruction, or blogs written about educational policy.

Since 2002, blogs have gained increased attention for their role in knowledge dissemination. Unlike the previous collaborative activities that were restricted within the walls of the classroom and discussion forums on learning management systems, with these Web 2.0 collaborative tools, students find themselves discussing a wide range of topics with peers worldwide. Blogs are widely available to all social Web users to read. Though many blogs include only one blog poster, there are group blogs where a group of participants blog and communicate with each other. Classroom blogs have become common where teachers are creating blogs for their students in class. Activities are conducted where students collaborate with peers from all over the world. There are a number of blog services providers.

Wikis. Wikis are a Website or a collection of Web pages that allow users to add and edit content collectively. The wiki enables documents to be written collaboratively, in a simple markup language using a Web browser. Wiki pages can be created and updated in no time. Most of the Wiki's are available to the general public to read and edit, however there are private wiki's that require secure access to alter the pages and even at times to read content.

Using wiki's, enable a group of learners to collaborate towards a common learning/performance outcome. All the learners are able to add, and edit information at the same time making it possible for users to derive information from each other, providing expertise on the areas they are familiar with, and drawing from other collaborators in novice areas.

Aggregators/RSS Feeds. RSS (Really Simple Syndication) is a method of describing news or other Web content that is available for "feeding" from an online publisher to Web users. RSS feed subscribers are able to receive updates on news, research or any other information in which they are interested. This information is brought to the user by an aggregator. An aggregator is client software that uses a Web feed to retrieve syndicated Web content such as Weblogs, podcasts, vlogs, and mainstream mass media Websites. Users do not have to go in search of all the updated information; instead the updated information is brought to them. This is an aspect of intelligence-based knowledge management where content created by other social Web users are available for the users to read using aggregators.

Using an aggregator, a user can read all types of information including news, books, project reports, blogs, research updates. Even research databases have integrated Web feeds, so users can receive the updated articles through their aggregators.

Social Bookmarking. Social bookmarking is a method for the social Web users to store, organize, search, manage and share bookmarks of Web pages on the Internet with the help of metadata. The social Web users book mark sites so that they can remember the sites at a later date and to share it with the other users. The sites bookmarked are organized in such a way that the knowledge is managed efficiently and effectively. When a user returns at a later date the site can be pulled out by using the appropriate tag. Bookmarking Websites can be accessed from anywhere in the world, which provides a definite advantage to the older bookmarking technique using favorites. Some social bookmarking services provide Web feeds for their lists of bookmarks and this allows subscribers to become aware of new bookmarks as they are saved, shared, and tagged by other users. Social bookmarking helps the collaborators access the tagged content that help them achieve their learning/performance goal.

Podcasts/vodcasts. A podcast is a digital media file that is made available on the Internet using syndication feeds, for playback on mobile devices and personal computers. Podcasts are used in a wide variety of ways, including distribution of school lessons, tutorials, music shows, commentaries etc. Podcasting is becoming increasingly popular in education. Podcasts, vodcasts and presentations that can be shared to collaborators with the purpose of helping them achieve their learning/performance goal. Rather than trying to reinvent the wheel, the users search for existing knowledge and learn from the experiences on specific learning and performance tasks of other social Web users.

Evaluation

Evaluation is most effective when it reflects an understanding of learning as multidimensional and integrated and when it effects change in specific student performance outcomes. In general, evaluation should focus on outcomes of student learning, should be aligned with the identified outcomes.

The role of the evaluation phase is similar to that of the facilitator in the analysis phase. The intent is to ensure that the required enabling contexts, resources, features, and scaffolding are present throughout the learning process. If the instruction was instructor-facilitated in the analysis phase, learning could be instructor-evaluated in this phase. Peer or self-evaluation is possible. However, it is important that the evaluator be an expert to provide meaningful contributions to improving learner performance. Novice peers may not be much help in evaluating the learning that has occurred.

In Web 2.0 ID, the evaluation phase is also incremental. It is likely that several collaboration cycles will occur at the formative level before attainment of the learning/performance outcome is

achieved. At the conclusion of each formative cycle the evaluator provides feedback both on the product and the design process. As learners advance though each formative cycle, their performance is scaffolded and the learners extend their understanding.

Design tasks for the evaluator include:

Establishing a feedback cycle
Ensuring the accessibility of necessary resources
Encouraging collaborative interaction
Clarifying and addressing misconceptions
Making a determination of outcome attainment

These tasks serve several purposes. They ensure the health of the user designed community. They model the appropriate peer feedback methodology that occurs during each formative cycle. And maintain a supportive context within which learners can navigate the process of learning. Eventually, the traditional formative cycles coalesce in the collaborative Web 2.0 environment and the evaluation reaches the summative stage.

The iterative nature of the process of user-generated learning with Web 2.0 provides for continual gains in the capacity to achieve more complex outcomes. As learners gain increasing design skills, the cycle of collaboration, contribution, and performance grows. Even summative outcomes may serve as a springboard for further learning.

Future Trends - Case studies

To further illustrate the flexibility of Web 2.0 ID, we present two case study applications, one in which the instructor assigned a learning outcome, and one in which the learning outcome was student negotiated with the instructor. Both applications utilized learner-generated design.

A multimedia model design activity in a Computer Based Instruction course.

The model was used in an graduate "Computer-Based Instruction" course taught at a southeastern university in the United States. The instructor of the course assigned the learning outcome to the students, which was to design a multimedia design and development model. The students were given the option to select one or more Web 2.0 tools to achieve this learning outcome (Blogs, Wiki, Forums, Virtual worlds, Podcasts, Mashups).

The instructor acted as the facilitator for this task and helped the learners analyze the tool (tool analysis) by a detailed Web 2.0 presentation. The users were able to analyze their technical competency and the cultural and ethical values aligned with the use of each of the Web 2.0 tools. This helped the learners reach the optimal competency level for using the tool before they collaborated to achieve the learning outcome.

The learners then collaborated with peers on the Web 2.0 platform to achieve their learning outcome. Once completed the task of the multimedia model design they submitted the results to the instructor for evaluation. The model in this situation was adapted such that the instructor was the facilitator who assigned the learning outcome; the learners collaborated with peers and constructed their learning and personalized it and finally submitted it to the instructor to be evaluated. The instructor, serving in the evaluator role provided feedback.

Defining emerging trends in an Introductory Instructional Technology course.

In this case, the model was used in an online graduate Introduction to Instructional Technology course at a university in the northwestern United States. Students were given the general learning outcome category of emerging trends in the field of instructional technology. Students were then encouraged to research emerging trends and technologies available for the assignment. The students negotiated their trend selection and the parameters of the product of learning outcome with the instructor. The only instructor-imposed limitations on the products were that they should be instructional in nature and no two groups/individuals may cover the same trend.

In contrast to the previous case, the activity was entirely peer facilitated with the instructor serving in the evaluator role. Given the task, each step of the analysis was peer assisted. Students self-selected into groups based on preliminary interest areas and identified strengths, weaknesses, technical competencies, and values associated with potential tools and formats for the final instructional product. The results of these analyses were presented to the instructor in the form of parameters for negotiation. Once parameters such as: group membership, topic, tool, and product format were determined, the learners then collaborated with peers using the determined tool to develop their instruction product and achieve their learning outcome. The majority of students remained in their interest group and collaborated to develop a wiki on their selected trend. Other products included instructional blogs, a podcast, and a collaborative video. The activity was completed with one evaluation cycle, in which the instructor provided feedback on the product. The activity culminated with presentations of the instructional products to the class.

This case is an example of how Web 2.0 ID can be used to introduce new concepts while allowing students to collaborate, socially construct new knowledge, and control their learning environment. Web 2.0 tools, such as the wiki, facilitate the iterative design process because the process essentially is the product. The application of Web 2.0 ID as used in this case is excellent for authentic tasks that require consensus building.

Conclusion

The emergence of approaches to learning that are based on self-determination and networked contexts such as heutagogy (Phelps, et al., 2005) and connectivism (Siemens, 2005) help us understand learning as making connections with ideas, facts, people and communities. Learning has grown beyond mere consumption of knowledge and become a knowledge creation process. New strategies for teaching require the examination of how the emergence of Web 2.0 redefines the competencies that are needed by instructors, peers and learners.

This chapter contributes to many fields by presenting an instructional design model designed to improve learning and performance using Web 2.0 tools. The model draws upon the theoretical principles of social learning theory and Social Construction of Technology and combines distributed cognition and social construction of knowledge to enhance the learning process. The model reflects the authors' assertion that social collaborative learning may occur anywhere along the pedagogy-heutagogy continuum. The model also reflects the merger of collaborative/social, learner designed, and intelligence-based knowledge managed learning dimensions that follow from the dictates of providing for co-configuration, co-creation, and/or the co-design of learning.

The model has application for any Web 2.0 tool including: podcasts/vodcasts, social bookmarking, RSS feeds, wikis, blogs, and social networking among others.

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Definitions

Web 2.0 – Web 2.0, a phrase coined by O'Reilly Media in 2004, refers to a perceived second-generation of Web-based service. Social networking sites, wikis, communication tools, and folksonomies are examples of Web 2.0 tools that emphasize online collaboration and sharing among users

Connectivism – "The integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual" (Siemens, 2004, para. 22).

Heutagogy – Heutagogy is the study of self-determined learning and emphasizes learning as knowledge sharing that is enhanced with the latest technological innovations and the changing structure of communities and workplaces

Instructional design – Instructional design is defined as a systematic development of instruction through analysis, design, development, implementation and evaluation.

Web 2.0 ID – A model designed utilizing the socio-constructivist philosophies and it can be adapted to different settings where Web 2.0 tools are used to improve learning and performance.