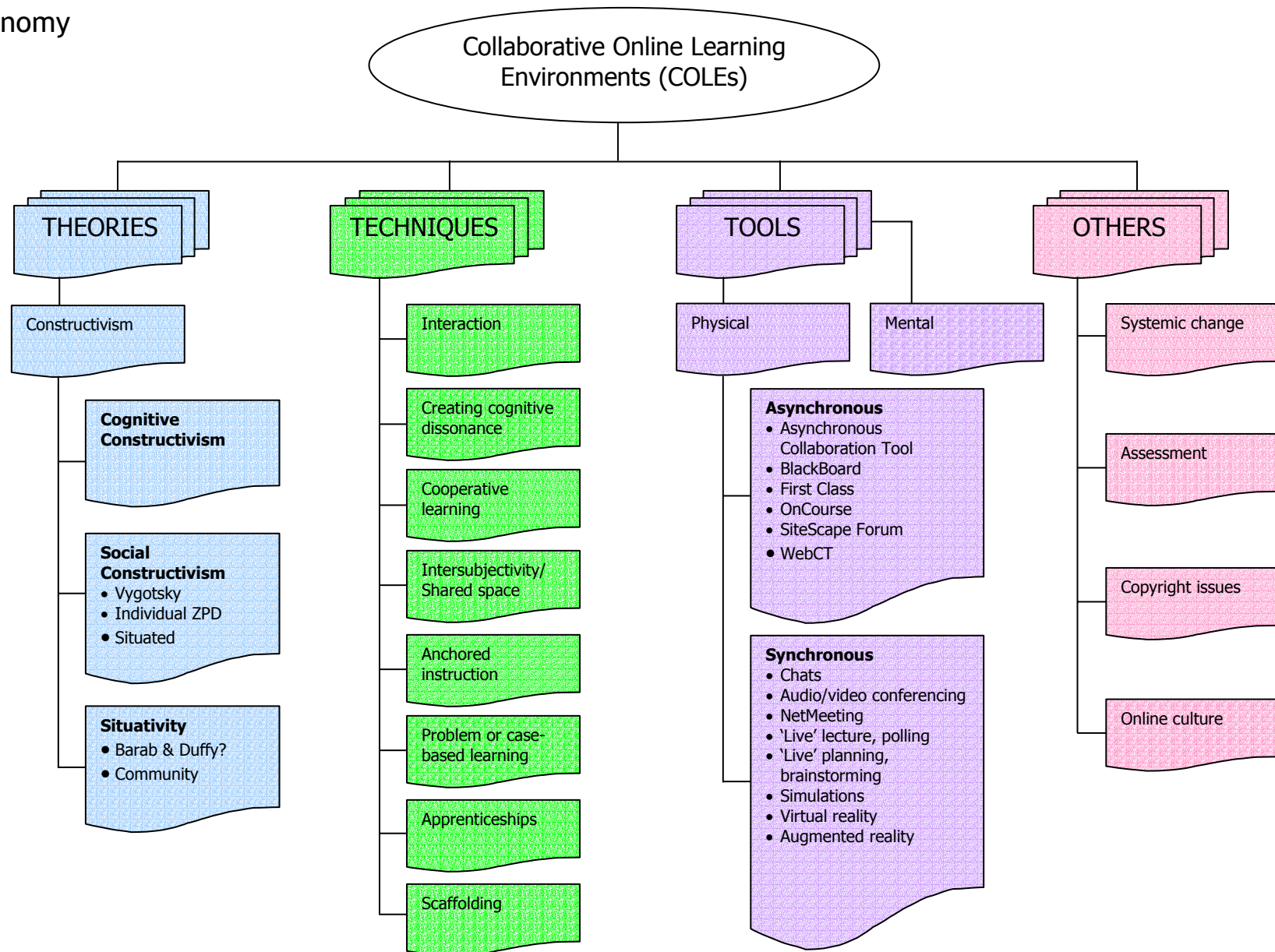


Taxonomy



Interpretation

One way to visualize what I have picked up or reinforced in the area of **collaborative online learning environments** (COLEs) is shown in the taxonomy provided. Another way is to imagine that each COLE is a modern skyscraper built upon a deep and firm foundation of sound educational **theories**. The various **techniques** that are built upon those theories are the steel and concrete that hold the building together. What is most obvious to the visitor of such a building are its rooms and facilities. These are the **tools** in such an environment. However, what makes such a building vibrant are the people that live and work within its walls. Their beliefs, mindsets, and practices determine if the work that went into the building was worth it.

While the four strands seem separate in the taxonomy, they are really blended into a building and should be viewed as such: A coherent whole instead of isolated building blocks. However, each strand needs to be described briefly before the whole makes sense.

No building should stand without a **foundation**. Likewise, COLEs should not be designed and built without due consideration to the principles on which it stands. While there are many “soils” to build on, constructivism (Bruner) allows for the complex architecture inherent to COLEs. Constructivism comes in a continuum of flavors that includes cognitive constructivism, social constructivism, and situativity. At the heart of these variants is the belief that people learn by interacting with others around them.

In **cognitive constructivism** (Piaget), an individual builds his/her own knowledge by interacting with the physical and social environment. **Social constructivism** (Vygotsky and Bandura) recognizes that learning is shared and situated in contexts common to a group of learners. Learning is personal process but developed further with the aid of outside others. In the company of others, a person is challenged to increase one’s zone of proximal development (ZPD, see Glossary). In addition, the process of learning is as important as the product of learning. The learning environment may not be “real world”, but the activities attempt to prepare the learner for future real world needs. For example, a class of novice instructional designers might be asked to predict design factors that increase the success of an online course. The novice designers do not necessarily have much experience this area and the online course may be fictitious. However, the novices would have shared their knowledge with others and could collectively suggest success factors. Bearing these factors in mind, they may then go on to design and develop real online courses.

The concept of **situativity** (Barab & Duffy) develops on social constructivism in that the learning environment is the community at large and is not confined to classroom examples. For example, if a learner is interested in medicine, then s/he might learn directly from a family doctor and perhaps do community service at a free clinic. In the online context, a novice instructional designer might consult with other novices and experts, eventually become an expert, and serve as a mentor to others. Learning and application are immediate and community-centered. Learners find meaning and establish an identity in their community.

Suitable techniques should be employed in building upon constructivist foundations. Some techniques are more generic, while others are used more often in certain flavors of constructivism.

COLEs should be designed to encourage various levels of **interaction**: learner-interface, learner-content, learner-expert/facilitator, and learner-learner. However, the latter two forms of interaction should be emphasized and encouraged in collaborative environments.

An online facilitator might provide novel material or ask controversial questions that create **cognitive dissonance** (Festinger) by challenging an individual’s understanding and perceptions. Cognitive dissonance may also be a result of online role-play. A learner might have to take upon

a role s/he is not usually comfortable with or may be exposed to the musings of other role players.

Learners should be exposed to **cooperative learning principles** prior to role-play or any form of online collaboration. Such principles include positive interdependence, individual responsibility, team skills and rules, and group processing (see Glossary). When such principles are clearly understood and practiced, learners are more likely to collaborate more effectively and efficiently.

In a COLE, learners need common goals to pursue, issues to chew on, problems to solve, or projects to work on. This is the concept of **intersubjectivity**. The shared space and content provides meaning and context for learning. Therefore, learners might be grouped according to work experience, interest areas, etc. Such groups may develop narrow views over time and an online facilitator would be wise to use cooperative learning strategies so that each group gets another group's perspectives, e.g. by using the jig-saw method.

One technique to make learning meaningful is **anchored instruction** (Bransford). Material presented to groups could be used to set a context for learning, e.g. Jasper Woodbury series of video discs. Another way to anchor instruction is by **problem** or **case-based learning**. Here real world problems or cases are provided for students to analyze or solve. While this technique can make learning more meaningful for individual learner, its value is increased by fostering interaction, conflict, and cooperation among learners.

Experts and learners may establish **master-apprentice relationships** or learners may take turns being experts depending on content area. A facilitator may establish **scaffolds** for novices to rely on during the initial learning process. Such scaffolding can be administrative, academic, social, or technical in nature.

The goal of these techniques is to increase each individual's ZPD, to move from one zone of development to another, and to fill a real world need. This is done by encouraging interpersonal interactions. How the techniques benefit an online community differs according to the foundations on which they are built. The end result is "selfish" in cognitive constructivism as each learner "takes" from others. The learning process is situated in social constructivism while each learner is expected to give back to the community according to the situativity theory. There is no good or bad technique and a designer/facilitator would be wise to use an assortment of techniques to benefit each situation. Having an idea of what tools are available for these tasks would also benefit the designer/facilitator.

According to Salomon, educational online tools may be physical or mental in nature. I will focus on the physical online tools that may be used in COLEs.

The taxonomy presents two broad categories of tools: **synchronous** and **asynchronous**. While these categories are shown separately, some of the tools belong in both categories. For example, course management tools such as BlackBoard and WebCT have synchronous components such as chat tools.

Due to a lack of space in the taxonomy, here is an expanded list of example synchronous tools:

- Chat: AOL Instant Messenger, Yahoo Messenger, IRC, ICQ
- Audio/Video conferencing: CuSeeme, Yahoo Messenger, NetMeeting
- Document exchange/sharing: NetMeeting, iMarkUp, ThoughtShare
- 'Live' lecture, audience polling: Engines behind HorizonLive; EpicLearning
- 'Live' planning, brainstorming, etc: Collaborative Work Lab
- Simulations: US Army game; Clark Aldrich's "Leadership" boardroom simulation
- Virtual reality: QuickTime 360° environments, VR museums
- Augmented reality: Information In Place

It would take too long to explain each tool and one might argue that tools are merely means to educational ends. A well-designed tool can fail miserably if poorly used. For example, a course management tool like OnCourse may be used only as a notice board and a document storage area. Its usage is not based on any constructivist theory and the techniques do not justify the use of the tool. On the other hand, a rudimentary tool might be used to full advantage. SiteScape Forum (SSF) is an asynchronous discussion forum tool that lacks the bells and whistles of many other course management tools. However, an experienced course designer/facilitator might use it as a medium for creating cognitive dissonance via online role-play while discussing pertinent issues.

Salomon might disagree that tools are merely means to an end. He believes that tools are naturally and culturally biased, and that require prerequisite skills and knowledge to operate. If educational online tools are used with specific techniques in mind (which in turn are based on educational theory), then tools are more than just media. Salomon also believes that classrooms and mindsets must change for tools to be really effective. Bearing this in mind, we proceed to the final category.

While the “Others” category was placed last in the taxonomy, the items listed there are critical factors in COLEs.

There are some in the field of educational psychology and educational technology who recognize that for tools, techniques, and theory to be effective, **systemic change** must take place. Among these “prophets” are Salomon, Reigeluth, Barab, and Duffy.

Much of current education still takes place in classrooms modeled against industrial systems. Students are like factory products with fixed standards for what gets shipped and what is rejected. Furthermore, the “learning” in schools does not necessarily prepare the individual for the community and workplace.

Changes that are required to support constructivist-type learning environments include teacher training, administration and policy-making, assessment, etc. Changes are required of beliefs, mindsets, and practices. Elaborating on these changes might take several volumes, so only the aspect of **assessment** will be covered briefly.

Traditional assessments often take the form of paper tests, some of which may be standardized across states or even an entire country. One cannot deliver a course online and assess it traditionally. Whole new assessment systems are required for new teaching and learning environments. At the moment, portfolios, reflections, group projects, and the like are not yet common assessment terms in teachers’ vocabulary.

Another potential barrier to effective COLEs is **copyright issues**. In constructivism, sharing is the name of the game. However, most administrative and business machines guard against this. Should online environments follow suit or will they successfully overcome this barrier? Copyright laws are still fuzzy and lagging behind technology and this complicates an already complex issue. For example, if a business leader teaches online using authentic material from his company, he is breaking company policy even if his heart is in the right place. If the course he designs becomes a course in an online university, to whom do the materials belong? Who do the materials generated by the students of that course belong to in a constructivist context? There are still no definite answers to these questions.

The remaining issue is **online culture**. Such cultures should evolve like any human culture. However, we are beginning to question the utility of that culture. If COLEs, e-learning, distance education and the like hold so much promise, then why do some educators discourage children from using computers and going online at an early age? Why does promise of “anytime,

anywhere” education become “none or all the time, only with a reliable connection” frustration? Why do educational institutions that offer online courses report that attrition rates are much higher for such courses than face-to-face equivalents?

Perhaps such courses and online environments are not designed with theory, techniques, and tools in mind. Perhaps online cultures are still in the “dark ages” and have yet to evolve to a “renaissance” stage. Whatever the case, we will not progress by stumbling around blindly. It is hoped that this taxonomy will shed some light in the area of collaborative online environments.

Theories, techniques, tools, and other factors determine if COLEs are successfully built and used. While it is important to see how each factor contributes to the whole, it is equally important to recognize that the whole is more than the sum of its parts. Just as a house is not automatically a home, there is no taxonomy that can effectively represent a COLE.

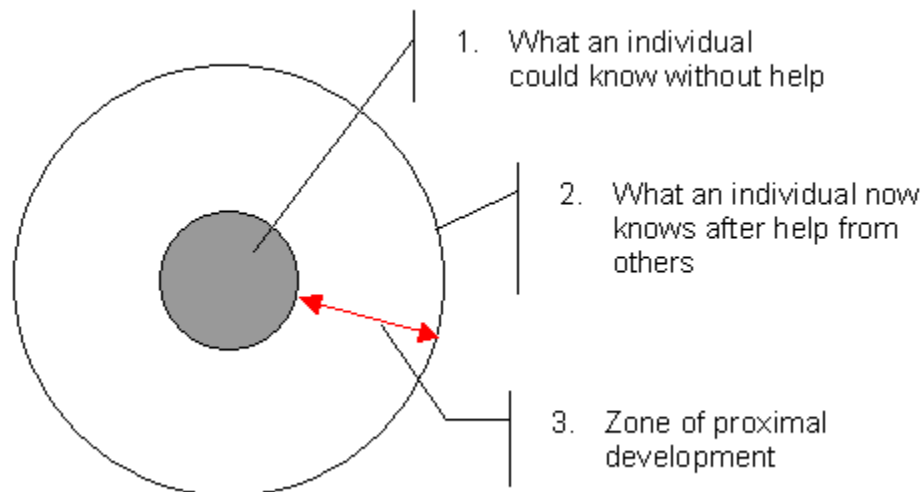
Thematic Glossary

Collaborative online learning environments: Technology-assisted environments designed on constructivist principles that promote cooperation and collaboration as a means of learning.

Constructivism: A theoretical framework that states that learning is an active process and that learners construct new concepts based on knowledge current and past.

Cognitive constructivism: A theoretical framework that states that the mind is in a person’s head (as opposed to being socially distributed). Learning is active, authentic, and holistic.

Zone of proximal development: The difference between knowledge gained by an individual on his/her own and knowledge gained by interacting with others (see figure below).



Social constructivism: A theoretical framework that states that the mind and knowledge is socially distributed. Learning is by discovery and is influenced by a learner’s social and cultural background.

Situativity: A theoretical framework that builds upon social constructivism. The source and beneficiary of learning is the community. The learner gains by interacting with members of that community and gives back by contributing to that community.

Interaction: In the online learning context, this refers to the interaction between the learner and the learning interface, content, other learners/peers, and experts/facilitators.

Cognitive dissonance: The state of mind when a learner encounters information that does not fit into his/her mental schema.

Cooperative learning principles:

- Positive interdependence: When members of a group have to rely on each other when given a common task.
- Individual responsibility: When each person in a group has something specific to do and is clear about his/her task.
- Team skills and rules: Agreed upon rules and codes of conduct on group work.
- Group processing: Evaluating each member's findings or behavior.

Intersubjectivity: Temporary shared learning space or content that is the context for interacting with other learners.

Anchored instruction: Instructional material that brings up relevant and realistic examples or problems. The learner is put in a situation that s/he can relate to.

Problem-based learning: A form of situated learning that originated from the medical field where learners find solutions to a complex problem by seeking information that is relevant to that problem.

Case-based learning: There is more than one definition. In this context, it is a form of situated learning where learners process case studies that may be meaningful to their experience, background, or culture.

Apprenticeship: The practice of learning by doing under the tutelage of an expert.

Scaffolding: Support structures that guide learners. Scaffolding can be academic/content-related, administrative, social, or technical.

Tools: In this context, physical tools are instruments that shape the learning process. Online tools fall into two main categories:

Synchronous: Tools used by learners at the same time in different places.

Asynchronous: Tools used by learners at the different times in different places.

Systemic change: Cyclical modifications that are made to all parts of a whole.

Assessment: A form of evaluation to gauge a learner's competency in a specific area or to determine if s/he has mastered a set of skills.

~ END ~