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Socio-technical Learning

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Synonyms

Socio-technical learning communities; Technology-enhanced learning

Definition

Socio-technical learning is the process of *research-based online learning* that combines individual and cooperative learning with opportunities to interact with other community members online or face-to-face. The approach focuses on socio-technical learning communities within higher education. The word *socio-technical* interrelates to technical systems as well as social structures – human communication and learning is integrated into a technical platform. A special case of socio-technical learning is experimental online learning.

Theoretical Background

Learning Paradigm

Socio-technical learning follows the constructivism approach. It means learning processes are cognitive constructed and socially framed. Learning is defined as a proactive process of constructing rather than acquiring knowledge. Individuals create sense of their own world. Everything they come in contact with is constructed by their own models of their experience. Hence, learning is not defined as simply the transmission of data from one individual to another, but a social process whereby knowledge is co-constructed in a situation within a community of practice (cf. Lave and Wenger 1991). Teaching or instructions have the task to support and scaffold (giving structures) this construction rather than communicating knowledge.

Current discussions in higher education focus on shifting the focus from the teacher's teaching to the student's learning. Promoting concepts for the shift from teacher-centered teaching to student-centered learning concepts are not new; however, discussions about pedagogical learning approaches got a new drive as new community platforms based on Web 2.0 technologies emerged, for instance, platforms for user-generated content like wikis, blogs, and social networking platforms like Facebook or Myspace (Jahnke 2009). The socio-technical approach has the claim to support teaching and learning differently. It says that a new balance between teaching and learning is essential for supporting creativity and best learning effects. Learning-centered approaches promote a re-orchestration of teaching and learning – information-generating, pushing-and-pulling arrangements for learners – where learning is regarded from the viewpoint of the learners.

Exploratory and Research-Based Learning: Foundation for Socio-technical Learning

Exploratory learning is an active process in which a learner constructs his own meaning based on his own experience. This means learners explore something (e.g., artifacts, hypotheses, ideas, and results) without having or giving a solution by the teachers. Learners "interact with the world by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments" (Bruner 1961). However, exploratory learning does not mean unguided learning (Kirschner et al. 2006). Exploratory learning concepts (also known as discovery learning) encourage the learner to do experiments and to uncover relationships. Learners get the opportunity to discover unknown and unexpected object properties, characteristics, and theoretical models by following various learning paths. Exploratory learning often follows Kolb's "experiential learning theory" (Kolb and Boyatzis 2000) covering four steps: concrete experiences (being involved in a situation, doing something), active experimenting (testing a theory by making a plan and following it), reflective observing (looking at an experience and thinking about it), and abstract concept-making (forming theories about why an experience happened the

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way it did). A pedagogical approach which includes appropriate structures for the teaching and learning process is called research-based learning (Jenkins et al. 2003) where students undertake research and inquiry. Teaching and learning is structured by the process of research phases (building hypothesis, delivering theoretical framework, making research design, doing inquiry, describing results, making conclusion).

A special case of socio-technical learning is experimental learning. It is defined as combined forms of research-based and experiential learning that take place within remote laboratories using an online learning platform with an Internet-based access.

Socio-technical Learning in the Age of Web 2.0

In a former typical one-room schoolhouse 100 years ago, "learning was social, not didactic," writes John Seely Brown. To foster learning as social process, one approach focuses on learning communities of practices. In words with Digital Natives, Technology-Enhanced Learning support social learning by using new media like Social Networking, Forums, or Blogs. Such Web 2.0 platforms offer new possibilities to easily enable social learning in groups (e.g., Jahnke and Koch 2009). The availability of web access from anywhere at any time has made it easier to engage students in learning communities and can also link weakly coupled learners. In the Web 2.0 age, some academic staff developers stress that socio-technical learning scenarios in higher education need more attractive concepts, for example, concepts that supports problem-solving without having any standard solutions by using Web 2.0 platforms or socio-technical learning communities.

Socio-technical Learning Communities

Socio-technical learning communities are forms of communities of practice – introduced by Lave and Wenger (1991) as well as Wenger et al. (2002). They are generated through social relationships among individuals "who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger et al. 2002, p. 4). With Preece (2000), socio-technical communities differ in the following four areas:

- Group size (e.g., in research on communities, groups with 25 members are considered small, whereas groups with 1,700 are considered very large)
- Primary content (e.g., discussion boards about Harry Potter books and movies, discussions about sports like marathon training, communication about stock exchanges, and information sharing about lectures at a university)
- Life span (e.g., several years or just for one topic)
- Presence (e.g., either pure online communication, face-to-face, or mixed communication)

For the design of socio-technical learning, the analysis of the appropriate interplay between social and technical parts is needed. On the one hand, socio-technical learning communities consist of actors who use technical systems to communicate and share knowledge. On the other hand, the technical system influences the interaction between community members (human–computer interaction).

Social Structures for Learning

In contrast to work groups in companies where the group members are formally bound, socio-technical communities consist of more informal than formal connections between members. Formal structures are characterized by conventional forms of behavior, and established conventions, for example, behavior which is formally bound by a work contract, or a formal role represented by a job/task description (e.g., formal moderator). Informal structures are rather casual, unofficial, loose, and not triggered by any rules (e.g., activities of informal moderation).

Social structures are patterns or interrelationships of social elements (e.g., human behavior and relationships within socio-technical communities) that can be called "roles." To observe the shape of roles in an online community, observable categories are needed. According to Jahnke's role model (2009), four categories are useful for analyzing and designing socio-technical learning processes:

(a) Learner's position within the community; relations to other members. Questions for designing socio-technical learning processes are how to bring the learners from outside to the middle of the core members and what methods can teachers use for .
(b) Learner's tasks/activities within the learning process. Questions for designing socio-technical learning processes are how to support different activities.
(c) Tacit, implicit, and explicit expectations of learners. Questions for designing socio-technical learning are how to support conflicting expectations or problems of learners within the research-based learning process.
(d) Interactions/role-playing (e.g., problem that students do not regarded themselves as researchers). Questions for designing socio-technical learning are how to give a structure for learners by having enough room for move, how to support role-changing, and what methods are useful.

Important Scientific Research and Open Questions

Based on mentioned theoretical background, a socio-technical learning model has the following dimensions:

- Social design for socio-technical learning (e.g., communication, different social modes, cooperation)
- Technical design (e.g., Web 2.0, technical platforms, usability)
- Pedagogical design (e.g., model which guided exploratory, research-mode learning)

and an appropriate interplay of all three dimensions.

The guided questions for designing are: what socio-technical design for research-based learning is needed? Derived questions are: what is an appropriate balance between teaching objects and learning activities in socio-technical environments, how to make learner-centered learning, or in other words, what is an attractive learning model from the student's perspective? What does an attractive exploratory, research-based learning model in higher education in special cases (e.g., Faculties of Engineering, Humanities, Social Sciences) look like? How can we measure the success, effect, and impact of socio-technical learning models?

Cross-References

► Communities of Practice
► Computer-Based Learning
► Computer-Supported Collaborative Learning (CSCL)
► e-Learning
► Online Learning
► Social Networks

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