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## Social Interactions and Learning

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### Synonyms

Collaborative learning; Peer learning

### Definition

Social interaction plays an important role in learning. Interacting with other people has proven to be quite effective in assisting the learner to organize their thoughts, reflect on their understanding, and find gaps in their reasoning. Underneath the broad umbrella of social interactions and learning, variants can range from peer learning, reciprocal teaching, learning by teaching, learning by observation, learning by doing, and self–other monitoring. These areas overlap in scholarship and are often an optimal way to help students learn. Different forms of collaborative learning can create ideal circumstances when examining the impact of social interactions on learning.

### Theoretical Background

Vygotsky believed that culture, history, and social interactions play a critical role in the cognitive development of children. Through observation, Vygotsky found that children develop higher mental functions such as identifying speech patterns, learning a language, and deriving meaning from symbols, when interacting with parents and other adults within the community. Vygotsky referred to language, numbers, signs, and symbols as cultural tools that help integrate the child into the culture. Vygotsky believed that the internalization of these cultural tools led to higher thinking skills. Children first learn how to use these cultural tools through the social interactions with parents, teachers, or more experienced peers, and later internalize the skills so they can perform independently. This is different from Jean Piaget's understanding of child development where development precedes learning.

Vygotsky's Zone of Proximal Development (ZPD) is a theory about the dynamic relationship between learning and development. ZPD is the area between the learner's independent performance level and the level that can be achieved with assistance of a more knowledgeable peer. ZPD not only reveals the learner's potential but also shows that with assistance, a higher performance level can be achieved.

Social interaction is also a critical component for other theories. Vygotsky's theories were further elaborated upon by other researchers and implemented into practical applications. Some examples are *Situated Learning*, when learning occurs in the same context in which it is applied. Learning is a social process that is co-constructed through the involvement in "community of practice" where members of the community share information and learn from one another (Lave and Wenger 1990). The novice learner embodies beliefs and behaviors through social interactions with more experienced members of the community. With time, the learner moves from the periphery of the community to the center, becoming more engaged and active within the culture, and eventually takes the role of the expert or senior member. Another example, *Cognitive Apprenticeship* (Collins et al. 1989), further develops the theory of knowledge construction through social interactions like coaching, scaffolding, modeling, and reflection. *Reciprocal teaching* (Palincsar and Brown 1984) is when the teacher or peer provides the learner with guided practice using four strategies of summarizing, question generating, clarifying, and predicting, when reading a piece of common text. The learner and teacher (or peer) take turns playing the lead role as a teacher, and use the four strategies to support their discussion on segments of the text. Over time, children begin to internalize the processes until the strategies become a natural part of their internal reading and listening skills. The strategies help the learner and teacher (or peer) develop deeper understanding of the text and better reading comprehension skills.

These theories have also been applied in the context of technology-based learning activities. Peer learning and collaborative learning was once only possible in shared



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physical space, but now learners can participate remotely via the Internet and technology-mediated tools.

## Important Scientific Research and Open Questions

People learn from various sources. Traditional sources involve learning from humans or objects (e.g., books), while recent sources may involve computerized people (e.g., pedagogical agents and avatars) and/or computerized instructions (e.g., intelligent tutoring systems). Social interactions also occur in various settings. Traditional settings involve face-to-face interactions in both formal and informal environments (e.g., classroom and private tutor), while recent settings can involve online learning environments (e.g., video conferencing systems like Adobe Connect and virtual reality environments like Second Life). Under this broad umbrella, the following may be considered: (1) learning in social interactions with others, (2) learning in social interactions with others through ► computer-mediated communication (CMC), and (3) learning in social interactions with technology.

*Learning in social interactions with others*: People often turn to others for learning. Social interaction plays an important role in learning, and has proven to be quite effective in peer learning, reciprocal teaching, and behavior modeling. Such forms of collaborative learning are often an optimal way to help people learn (Chi et al. 2001). For example, Learning by teaching and explaining to others can be an effective way to learn (Palincsar and Brown 1984). Another situation may be learning by observing other people. In tutoring, one observes whether their pupil applies what they were taught during problem solving. Their pupils' performance can reveal gaps in what the tutor taught and perhaps understands. The performance of the pupil can provide alternatives the tutor did not think of. Even if these alternatives are not correct, they may slow down the tutor's natural inertia to keep thinking in the same way. Studies have shown that learning among peers can be very useful in several ways. Learning can occur by comparing ourselves to peers, or observing others to develop a better understanding of the self. For example, even if a student cannot solve a math problem, observing someone else may help you learn how to solve the problem. This is because the person they are observing can provide a model of competent performance. In other situations, interacting with somebody who knows about the same as (or knows less than you) can be beneficial. For example, in reciprocal teaching, students may spontaneously compare their understanding to what they observe in another person, and any discrepancies can alert them to think more deeply about who is right. This implies that observing a peer, under the right circumstances, can trigger learning and reflection. In other cases, just anticipating a social interaction can lead to more learning. For example, *preparing to teach* others influences students to learn more compared to students who study for themselves (e.g., study for exam). In this case, learning occurs just with the "thought" of a social interaction.

*Learning in social interactions with others through computer-mediated communication tools:* There is no need to be physically present to learn in person. Through the use of the Internet technology and computer-mediated communication tools, real-time social interactions are possible. Many synchronous online learning (or distance learning) environments use video conferencing tools that allow face-to-face interaction via technology mediation (e.g., Adobe Connect). More recent forms of online learning may involve virtual reality (e.g., Second Life) where your peers are represented by a computer graphic character that they remotely control in a virtual reality environment (e.g., an avatar). Such technological tools allow real-time exchange of audio, video, text, and graphical information between learners (Dede et al. 2002). Successful virtual reality environments such as Second Life and Active Worlds provide space to support online group activities. There are some concerns that social interactions are limited in online learning, compared to the traditional face-to-face learning experience. Others attest that technology-mediated tools can elicit social responses and create unique social interactions with interesting implications for learning. For example, children can *build* their own simulated world (e.g., Eco-system) rather than passively partake in a given situation. This may allow children to directly experience the causal chains from their actions and help visualize and reason about the situation. Another distinct feature in virtual reality is that the learner's environment can be manipulated based on their needs. For example, the teacher can be represented differently to communicate with the learner in the most optimal way (e.g., with or without eye contact), allow the learner to experience different points of view (e.g., first person, third person, and birds-eye view), and the seating in virtual classrooms can even be positioned based on the learner's attention level.

*Learning in social interaction with technological tools:* Applying educational content and pedagogy to technology is not new. The first testing and teaching machine by Pressey appeared in 1926, and since then people have had high hopes for technology in restoring personalized instruction. Technology has the potential to provide a wide range of tools tailored to each student's learning needs. However, much of the *learning* in the initial stage focused on *machine learning*, intelligent expert systems, and computer modeling of human behavior. Expert systems were successful in their intended domain, but often evaluated unfairly, because of the high expectation of the ► Turing Test. Some have argued that by making machines smarter, good teaching and tutoring strategies can be implemented for the learner. However, interactions with intelligent machines do not always guarantee learning. Learning can be difficult without a meaningful interaction between the human and machine. Recently, development has shifted the focus from intelligent to *directable* technologies in assisting *human learning*. Computerized people and instructions still consist of intelligent behaviors, but more emphasis is placed on human-like features for eliciting social responses. Technological tools such as pedagogical agents, tutoring agents, and humanoid robots, consist of strong social components that enable students to share knowledge and build peer-like relations. However, not all technologies put emphasis on direct social exchange with humans (e.g., industrial robots). Most fall somewhere in between, and partake of both machine-like and human-like features (e.g., pedagogical agents and humanoid robots). Some systems may tacitly draw on social schemas, but not include a real social presence or metaphor. For example an intelligent tutor that is a computational model may represent student thinking and cognition, but its appearance may be a disembodied text with no visual character. Other systems build on explicit social metaphors of interaction and appearances to invite social interaction. An example may be a socially explicit pedagogical agent taking on the role of a peer learner. Students learn by teaching this pedagogical agent. Based on what the agent is taught, the agent can answer questions. Students can observe their agent's answers and revise the agent's understanding (and their own). The learner can structure their thoughts through the social interactions with the agent, and even develop metacognitive skills (Biswas et al. 2001).

Aside from content, advancement in sensors and audio-visual tools has helped *detect* human behavior (e.g., physiological sensors). Automation and expressive tools have helped technological tools *respond* to humans. Sensors and behavior models implemented into the system have improved some aspects in the quality of social interactions between human and machines. However, technological tools still fall short when coming across unfamiliar content, and do not easily afford the wide range of possible social interactions. Unlike a human peer or teacher, technology presents limitations, where the learner may often times be constrained by what the tool (e.g., pedagogical agent) or environment (e.g., Second Life, avatars) can do in response. Until technological tools have both the intelligence and flexibility to respond to the learner's interactive bids, examining the social exchange and interactive styles that guide learning is crucial.

## Cross-References

► Cognitive Apprenticeship Learning
► Learning by Teaching
► Reciprocal Learning
► Situated Learning
► Observational Learning
► Online Learning
► Pedagogical Agents
► Peer Learning and Assessment
► Vygotsky's Philosophy of Learning
► Zone of Proximal Development

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