Cognitive Apprenticeship

General

Cognitive apprenticeship is an instructional design model that emerged from situated learning theory and was introduced in 1989[1] and developed by Allan Collins, John Seely Brown and their colleagues. The authors

- "*... propose an alternative model of instruction that is accessible within the framework of the typical American classroom. It is a model of instruction that goes back to apprenticeship but incorporates elements of schooling. We call this model cognitive apprenticeship.*"[2]

Cognitive here means that emphasis is on teaching of cognitive rather than physical skills, and *apprenticeship* means that learning will occur through interaction with a more experienced tutor.[3]

What is cognitive apprenticeship?

Cognitive apprenticeship is a way of learning through experience guided by an expert. Motivation for this approach came from criticisms of formal education that usually separates learning from practice and teaches skills and knowledge in an abstract manner, making it difficult for the students to apply the learned knowledge in real-world situation. According to Brown,

- "*the central issue in learning is **becoming a practitioner**, **not learning about practice**.*"[4]

Learning is here, just as in situated learning theory defined as naturally tied to activity, context, and culture which form the learning context and occurs through *legitimate peripheral participation* (a process in which a novice joins a communities of practice on periphery and as he learns moves toward full participation).

Cognitive apprenticeship focuses on four dimensions that constitute any learning environment[5][6]:

1. Content (Knowledge type)			
Domain knowledge (declarative knowledge like concepts, facts, and procedures)	**Heuristic strategies** (general techniques for accomplishing tasks)	**Control strategies** (general steps for directing one's solution process)	**Learning strategies** (knowledge about how to gain new knowledge)
2. Method (Way of learning)			

Modeling - students model a decision-making process by observing an expert reasoning. In general, modeling can be behavioral (learning a motor skill through imitation) or cognitive (modeling a decision-making process by observing an expert reasoning), but cognitive apprenticeship is oriented mostly on cognitive modeling.	**Coaching** - sometimes considered the same as mentoring and sometimes different[7)][8)]. Usually those processes include an expert offering advice, hints, verbal descriptions, diagrams, questioning, assistance, support, exercises and explanations to learners trying to perform the task.	**Scaffolding**[9)] - according to some, scaffolding is just a form of coaching. Expert supports students when they need it, but then gradually removes his support as they advance. There are two types of scaffolding: directive (a teacher-centered approach where expert provides learners with strategies of successful students) or supportive (a learner-centered approach where he provides strategies that fit to student's current interests and needs).	**Articulation** (teacher encourages students to verbalize their knowledge and thinking), **Reflection** (teacher encourages students to compare their ways of problem-solving with others), and **Exploration** (teacher encourages students to pose and solve their own problems)

3. Sequencing (Keys to ordering learning activities)		
Increasing complexity (meaningful tasks gradually increasing in difficulty)	**Increasing diversity** (practice in a variety of situations to emphasize broad application)	**Global to local skills** (focus on conceptualizing the whole task before executing the parts)

4. Sociology (Social characteristics of learning environments)			
Situated learning (students learn in the context of working on realistic tasks)	**Community of practice** (communication about different ways to accomplish meaningful tasks)	**Intrinsic motivation** (students set personal goals to seek skills and solutions)	**Cooperation** - students work together to accomplish their goals

What is the practical meaning of cognitive apprenticeship?

Multimedia and **virtual reality** today enable more and more learners to experience a rich, **almost real-world context** for learning and **apply learned content** rather than just be forced to memorize facts.

A difference between decontextualized and contextualized learning in educational process can be explained on following example[10)]:

APPROACH 1: classroom (decontextualized, inert)	APPROACH 2: authentic (situated in real world problem to solve)
For example, give students a task to through the Photoshop reference manual, tool by tool (or specify a set of tools), in alphabetical order, learning how each tool (line, paint, bucket, select, etc.) works including all possible optional settings.	For example, give students a task such as, create a logo for a company. To accomplish it, they should look up and learn only a few particular tools they realize they may need to use to accomplish the design. Demonstrate the task (modeling), explain why each of the sub-tasks is required (explanation), guide students during their task performance (coaching, scaffolding), ask them to reflect and articulate how they solved the task, and require from them to explore similar problems (exploration).

Criticisms

The ideas of cognitive apprenticeship are subjected to same criticisms as situated learning since they are rooted in that theory. Aside from that,

- "*it may not be advisable to use cognitive apprenticeship methods for initial learning, since the learners discover what they need to know. But for learning at advanced levels and consolidating knowledge so that it can be utilized in increasingly divergent situations, the methods based on situated cognition provide an exciting alternative to current instructional approaches.*"[11)]

Keywords and most important names

- **Cognitive apprenticeship**, **situated learning**
- Allan Collins, John Seely Brown

Bibliography

Dennen, V. P. Cognitive apprenticeship in educational practice: Research on scaffolding, modeling, mentoring, and coaching as instructional strategies. Handbook of research on educational communications and technology: 813–828. 2004.

Conway, J. Educational Technology's Effect on Models of Instruction. University of Delaware. Retrieved March, 6. 2011.

Collins, A., Brown, J. S., & Newman, S. E. (1987). Cognitive apprenticeship: Teaching the craft of reading, writing and mathematics (Technical Report No. 403). BBN Laboratories, Cambridge, MA. Centre for the Study of Reading, University of Illinois. January, 1987.

Oliver, K. Situated Cognition & Cognitive Apprenticeships. Presentation, 1999.

Stalmeijer, Renée E., Diana H. J. M. Dolmans, Ineke H. A. P. Wolfhagen, and Albert J. J. A. Scherpbier. Cognitive apprenticeship in clinical practice: can it stimulate learning in the opinion of students? Advances in Health Sciences Education 14, no. 4: 535-546. October 2009.

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Idol, L., Beau, F. J. Educational values and cognitive instruction: implications for reform. North Central Regional Educational Laboratory (U.S.). Routledge, 1991.

1)
Collins, A., Brown, J.S. & Newman, S.E. Cognitive apprenticeship: Teaching the craft of reading, writing and matematics. In L.B. Resnick (Ed.), Knowing, learning and instruction: Essays in honor of Robert Glaser (pp. 453-494). Hillsdale, NJ: Erlbaum, 1989.

2)
Collins, Allan, John Seely Brown, and Ann Holum. "Cognitive Apprenticeship: Making Thinking Visible." American Educator 15, no. 3: 6-11. 1991.

3)

Collins, Allan. Cognitive Apprenticeship. In The Cambridge Handbook of the Learning Sciences, 2006.

4)

Brown, J. S. Internet technology in support of the concept of //communities-of-practice//: The case of Xerox. Accounting, Management and Information Technology, 8, 227–236. 1998.

5)

Collins, Allan. Cognitive Apprenticeship. In The Cambridge Handbook of the Learning Sciences, 2006.

6)

Enkenberg, Jorma. Instructional design and emerging teaching models in higher education. Computers in Human Behavior 17, no. 5-6: 495-506. September 2001.

7)

Dennen, V. P. Cognitive apprenticeship in educational practice: Research on scaffolding, modeling, mentoring, and coaching as instructional strategies. Handbook of research on educational communications and technology: 813–828. 2004.

8)

Parsloe, E., & Wray, M. Coaching and mentoring: Practical methods to improve learning. London: Kogan Page, 2000.

9)

Originally this term comes from Vygotsky's social development theory

10)

Borrowed from Heeter, C. Situated Learning for designers: Social, Cognitive and Situative Framework. 2005.

11)

Dills, Charles R., and A. J. Romiszowski. Instructional development paradigms. Educational Technology, 1997.