

Discovery Learning

General

Discovery learning is a learning model introduced in 1960s by one of the founders on [constructivist theory](#), [Jerome Bruner](#), but closely related to works of [Jean Piaget](#) (see: [Stage Theory of Cognitive Development](#)), [Lev Vygotsky](#) (see: [Social Development Theory](#)), [John Dewey](#) and [Seymour Papert](#) and later further developed by other researchers. Bruner's theory is considered to be fully constructivist in nature. Discovery learning according to him is a inquiry-based instructional approach in which the learner builds **new knowledge from prior knowledge and active experience**.

What is discovery learning?

In contrast to classical teaching methods in which the learner is usually passive and expected to assimilate the knowledge presented by the teacher¹⁾, discovery learning offers a **learner-centered approach** in which the learner discovers new knowledge through **active, hand-on experiences**²⁾ and construct new concepts based on his existing knowledge. This kind of learning is **oriented on the process** of learning, rather than on its content and information. According to Bruner,

- *"practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving."*³⁾

Another important aspect of discovery learning is failure, which is viewed as an important element of learning to the extent that learner hasn't really learned anything if he hasn't failed during the learning process.

Later in his career Bruner adopted a more social and political view of learning and language acquisition influenced by [Lev Vygotsky's social development theory](#).

Main attributes of discovery learning, as described by Bicknell-Holmes and Hoffman⁴⁾ are:

- **exploring and problem solving**, which stimulate learners to actively approach to creation, acquisition and generalization of new knowledge instead of passively being exposed to lectures and practice,
- **taking responsibility for learning** in terms of the ability of learners to choose their own learning pace, and
- **building new knowledge** from the existing.

The characteristics in which discovery learning differs from classical learning are⁵⁾:

- active rather than passive learning,
- learning is process-oriented rather than content-oriented,
- failure is important,
- feedback is necessary, and
- understanding is deeper.

What is the practical meaning of discovery learning?

Bruner's constructivistic principles of discovery learning claim that instruction must⁶⁾:

- **provide** students with **experiences and contexts** that make them willing and able to learn (readiness),
- be structured in a **spiral manner** so that the student keeps developing learned concepts in more and more details, and
- be designed to **facilitate extrapolation** that enables student going beyond the information given.

The role of the teacher in such instructional process can be either to provide students with information when necessary (*guided discovery*) or not provide them with information at all (*unguided discovery*).

These principles offering an idea of what instructional process should look like were implemented in several mostly very similar architectures of discovery-based learning:

- [Case-Based Learning](#)
- [Incidental Learning](#)
- [Simulation-Based Learning](#)
- [Goal Based Scenarios](#)
- [Problem-Based Learning](#)

Criticisms

Discovery learning has been subjected to many criticisms lately (see: [criticisms of constructivism](#)), with more and more studies showing:

- **inefficiency** of pure discovery learning, especially for novice learners, and
- strong positive effects of guided instruction and worked examples, mostly excluded from learning by discovery⁷⁾⁸⁾⁹⁾¹⁰⁾.
- *"In summary, learners encounter problems with all processes characteristic of discovery learning such as stating hypotheses, designing experiments, interpreting data and regulating the learning process (monitoring and planning)."*¹¹⁾

Still, this debate is ongoing as various researchers still find that guided discovery can result in better learning than explicit instruction¹²⁾.

Keywords and most important names

- [Jerome Bruner](#)
- **discovery learning, discovery-based learning, guided discovery, exploring**

Bibliography

Bicknell-Holmes, Tracy, and Paul Seth Hoffman. Elicit, engage, experience, explore: discovery learning in library instruction. *Reference Services Review* 28, no. 4: 313-322. 2000.

Cooper, S. Theories of Learning in Educational Psychology: Jerome Bruner. *Constructivism & Discovery Learning*. Retrieved June 6, 2011.

Discovery Learning (Bruner) at Learning Theories. Retrieved June 2, 2011.

Castronova, J. Discovery learning for the 21st century: what is it and how does it compare to traditional learning in effectiveness in the 21st century. *Literature Reviews, Action Research Exchange (ARE)* 1, no. 2). 2002.

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Bruner, J. *Toward a Theory of Instruction*. Cambridge, MA: Harvard University Press. 1966.

Bruner, J. *The Culture of Education*. Cambridge: Harvard University Press. 1996.

Bruner, J. *On knowing: Essays for the left hand*. Cambridge: Harvard University Press. 1967.

Bruner, J. *The Relevance of Education*. Norton, 1971.

1)

See for example: [Assimilation theory](#).

2)

Bruner, J. S. The art of discovery. *Harvard Educational Review*, 31, 21-32. 1961.

3)

Bruner, J. S. The act of discovery. *Harvard Educational Review*, 31(1), p26. 1961.

4)

Bicknell-Holmes, Tracy, and Paul Seth Hoffman. Elicit, engage, experience, explore: discovery learning in library instruction. *Reference Services Review* 28, no. 4: 313-322. 2000.

5)

J. Castronova. Discovery learning for the 21st century: what is it and how does it compare to traditional learning in effectiveness in the 21st century. *Literature Reviews, Action Research Exchange* 1, no. 2, 2002.

6)

Huitt, W. *Constructivism*. Educational Psychology Interactive. Valdosta, GA: Valdosta State University, 2009. Cited by Uriarte, John, and Jen Uriarte. *Constructivism and Technology in the Classroom*. Boise State University.

7)

Mayer, R. E. Should There Be a Three-Strikes Rule Against Pure Discovery Learning?. *American Psychologist* 59, no. 1: 14. 2004.

8)

Kirschner, P. A, J. Sweller, and R. E Clark. Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational psychologist* 41, no. 2: 75-86. 2006.))(((http://www.cogtech.usc.edu/publications/sweller_kirschner_clark_reply_ep07.pdf|Sweller, J., P. A Kirschner, and R. E Clark. Why minimally guided teaching techniques do not work: A reply to commentaries. *Educational Psychologist* 42, no. 2: 115-121. 2007.

9)

Alfieri, Louis, Patricia J. Brooks, Naomi J. Aldrich, and Harriet R. Tenenbaum. Does Discovery-Based Instruction Enhance Learning? *Journal of Educational Psychology* 103, no. 1: 1-18. February 2011.

10)

Schwonke, Rolf, Alexander Renkl, Carmen Krieg, Jörg Wittwer, Vincent Aleven, and Ron Salden. The worked-example effect: Not an artefact of lousy control conditions. *Computers in Human Behavior* 25, no. 2: 258-266. March 2009.

11)

de Jong, T., W. R. van Joolingen, J. Swaak, K. Veermans, R. Limbach, S. King, and D. Gureghian. Self-directed learning in simulation-based discovery environments. *Journal of Computer Assisted Learning* 14, no. 3: 235-246. September 1998.

12)

Alfieri, Louis, Patricia J. Brooks, Naomi J. Aldrich, and Harriet R. Tenenbaum. Does Discovery-Based Instruction Enhance Learning? *Journal of Educational Psychology* 103, no. 1: 1-18. February 2011.

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