

Internal (Endogenous) Constructivism. Internal constructivism represents a learning paradigm that begins with the learner's internal cognition and shapes an understanding of the external environment through that mental lens. This view of constructivist learning has many implications for instructional design, methods of delivery, and assessment of student accomplishment. At this point, the emphasis is still on the learner as an individual. In more radical forms of constructivism, our focus will shift from individuals to construction of knowledge among social groups. This more radical view will be discussed as blended constructivism in the next section.

Cognitive orientation. Learning theorists believe that, from the internal constructivist paradigm, learners view and interpret the world according to their mental frameworks, which have been constructed and modified over time. There is a strong assumption of a biological organism with this perspective. *"Piaget's stagewise view of cognitive development, for example, is a prominent representative of endogenous [internal] constructivism"* (Bruning, Schraw, & Ronning, 1999, p. 216). This view of the learner's mental frameworks gives many clues for instruction. Here, instruction is more learner-centered and requires an engagement between the facilitating teacher and the student that surfaces and then builds on the learner's prior knowledge.

Nature of knowledge. Knowledge is more abstract in this perspective and is developed through cognitive activity. Furthering this epistemological view, to these researchers, knowledge is constructed. This is in contrast to the indigenous [external] assumption that knowledge is primarily passive in nature.

Another perspective is that knowledge is invented, not discovered, as would be asserted by other constructivists. The invention of knowledge would suggest that the nature of what is true is likely to be different for each learner. *“We always perceive and know the world from some socio-cultural, and historically situated, point of view. Hence human knowledge is always to be seen as a ‘construct,’ a product of the human mind”* (Fox, 2001, p. 25). To the extent that knowledge is constructed, learning is then a matter of understanding the meaning of information and how it fits with other bits of knowledge.

Learning assumptions. In internal constructivism, learning is the creation of new mental frameworks, based on engagement with the exterior world. Learning is about understanding and making meaning. This type of learning demands more than rote learning and recall (Fox, 2001). It implies a deeper examination of relationships between and among ideas and concepts.

Creating new mental frameworks occurs naturally as the learner is challenged to dig deeper. For example, vocational students can be encouraged to explore reasons why construction principles and practices in an earthquake-prone areas such as Western California are different than those used in houses located in the “tornado ally” of the Midwest. Their exploration could encourage them to build a structure of each type and “field test” their designs in simulated conditions. This learning opportunity encourages the learners to add to their existing mental frameworks on the physics of stresses and loads, but also encourages the meaning of making appropriate choices for varying conditions in real or simulated contexts and settings. When inappropriate buildings are

constructed, there can be serious social consequences in terms of injuries, deaths, and loss of property. Learning to build structures can be as simple as basic construction practices or as complex as building and testing a structure that leads to an understanding of underlying principles of physics. In this way, learners can make meaning of their lessons while increasing the likelihood of making appropriate and socially responsible choices.

Instructional practices. Instructional practices under internal constructivism can be conceived as learner-first. The learners utilize knowledge and skills that have been previously converted into mental structures to understand and interpret their world. In many cases, the teacher follows the lead of the student. The learner determines the context and settings for learning. For this reason instruction may or may not be deeply immersed in an authentic context or physical settings. Learning and teaching relies on the learners' cognitive understandings of those realistic, imagined, or simulated contexts from their own mental frameworks. A combination of more abstract settings are interspersed with more real life applications.

A key component of teaching in this way is to utilize learning activities and resources that are appropriate to the learner's current stage of development. Using Piaget as an example, strategies and instructional activities are tied to the anticipated stage of development for the chronological age of the learner. For example, a middle school aged child could be assumed to be capable of higher-order matching of ideas and synthesizing them into larger constructs.

The learner's own exploration, barriers, and expectations for what they want to learn determine ***instructional content***. Under the guidance of a skilled facilitating teacher, content to be learned might range from mastery of basic information to higher levels of expertise. Learners demonstrate understanding of how data are connected and then move to higher levels where they demonstrate "control" of their knowledge. Beginning teachers at this stage would have the ability to use their knowledge to solve a problem presented by a student with attention deficit. This is often characterized by the learner's use of specific information to solve an unstructured problem. The highest level of content is when learners have achieved command of information and use it to create learning strategies to solve never before encountered problems.

Instructional methods used by teachers might include facilitating methods. To begin an instructional sequence, a teacher might engage in a conversation with a student who has already partially explored an intellectual path of his or her own choosing. Probing questions might reveal some estimate of the learner's level of knowledge. This initial practice might also reveal any misconceptions that may have been incorporated into the schema of the learner. Other methods such as "scaffolding" and "fading" might be employed to assist learners while they demonstrate their incomplete knowledge. Skillful teachers provide the learner with a scaffold or bridge to other related information by performing some of the tasks for the student. At a later time, students will be able to perform this part of the task for themselves as the teacher fades from the direct instructional role.

Exploration is an important strategy in internal constructivist perspectives. A learner might be encouraged to identify or select among a range of topics that they find personally interesting. Teachers and learners can negotiate a project that will require the student to probe the topic. As that project is in process, the teacher works with the learner by acting as a guide and mentor. The teacher asks probing questions of students and encourages them by giving direction when needed or solicited. This strategy allows students to seek information on topics that are important to them and are matches with their prior knowledge.

Probably the most important role here for the teacher is to provide opportunities for students to articulate their old and new knowledge and to then aid them as they systematically reflect on its importance, meaning, and how it might change their intellectual identity. Skillful facilitating teachers employing internal constructivism encourage their student learners to push beyond their perceived limitations of their mental schema as they view the outside world. Asking learners to articulate their knowledge and then to reflect on its meaning is an important way to push learners to higher levels of performance.

Effective teaching in this paradigm also means that the teacher is able to draw from the learners their vision and interpretation of the context and settings in which information has been encountered. The teacher is then able to physically or virtually enter that context and setting to aid the learners as they extract information and knowledge.

The facilitating teacher can choose from a variety of instructional sequences within this model, but of course their choices are guided by the

learning strategies and preferences of the learner. Some learners may prefer to learn using a linear progression beginning with basic and progressing step-wise towards more complex applications of knowledge. Other learners may see a single skill or idea that has a variety of applications throughout a given topic area. In this case the teacher can enable understanding and application of this core idea and illustrate how it is used in a variety of situations.


Other approaches to sequencing instruction from the perspective of an internal constructivist would be to provide students with a learning activity that requires them to engage with the global overview of a specific topic. In other words, they get the “big picture” which then becomes a larger framework where more detailed pieces of information are attached and connected with each other.

Assessment of student performance usually conducted using traditional methods. Using this approach teachers present assessment material taken from classroom-based activities, and require students to use information learned to recall answers to stimulus-based questions.

Supporting theories. Piaget’s work with learning in biological organisms is basic to this perspective. A key process is the coordination of cognitive activities. To these theorists, truth is not represented by physical reality, but that truth is in the mind and hearts of the learner. “... *knowledge exists at a more abstract level and develops through cognitive activity*” (Bruning, Schraw, and Ronning, 1999, p. 216). Cognitive structures are created from other earlier

structures. What is true are those mental frameworks that are consistent with those developed based on prior knowledge.

Example UGA CTL practice from this perspective. Here is an example of



The diagram consists of a horizontal bar divided into four sections. The first three sections are grouped under the heading 'Constructivist Perspectives'. The first section is 'External Constructivism', the second is 'Internal Constructivism', and the third is 'Blended Constructivism'. Dotted arrows point from 'External Constructivism' to 'Internal Constructivism' and from 'Blended Constructivism' to 'Internal Constructivism'. The fourth section is a dark blue box labeled 'Situated Cognition/Communities of Practice'.

CTL Example of Internal Constructivism

Several CTL activities reflect external constructivist practices. Dr. John Schell used this approach when supervising several undergraduate students in internship activities. One example included two students on a paid internship with the Centers for Disease Control and Prevention (CDC).

While Trudi Bothma & Chessa Knight interned at the [Center for Disease Control & Prevention, Excite](#) in Atlanta, Georgia, they were given an opportunity to develop instructional materials that have (will be) now been posted to the Excite web page for the CDC. Much of their work required them to learn independently with regards to epidemiology and their assignment in developing contextualized lessons and case studies for use by middle school and high school students throughout the nation.

Dr. Schell facilitated the development of the instructional strategies that were embedded into the case studies and the subsequent field test with middle school students St. Mary's, Georgia. The field test included a week-long instructional period where middle school students became disease detectives and devised strategies to combat a breakout of Legionnaire's Disease. The resulting materials include case studies and suggested information to teachers for contextualizing their lessons when using these materials.

external constructivism that involves two UGA CTL students.

Relationship to continuum of context. Internal constructivism is located on the context continuum as “moderately” contextualized when compared to the UGA definition of context and settings. The reader will notice that the area of

external constructivism is marked with a gray arrow on the graphic. This would mean that students are asked to use their imagination to contextualize lessons as they are encountered and taught. Wolff summarizes internal constructivism by emphasizing the individuality of learning and the importance of different forms for each learner. *“The outcome of any particular learning process varies from learner to learner, because knowledge is always subjective and takes different forms for each particular learner”* (1996, p. 2).

The next type of constructivism is a blend on both internal and external constructivism. The cognitive orientation moves from the individual to how groups of individuals construct knowledge in social settings.