Making Connections:  
A Personal Theory of Practice

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“Learning is a persisting change in human performance or performance ability … [and] … must come about as a result of the learner’s experience and interaction with the world” (Driscoll, 2005, p. 9). It is in these interactions and experiences that the fundamental process of learning, that of making connections, takes place. By recognizing patterns, learners connect their interactions and experiences to concepts or principles that shape and alter the way they think or act.

The principles behind constructivist theory have greatly influenced my understanding of the process of learning, and by that, my personal practice. The concept of learner’s constructing meaning has fundamentally altered my thoughts on learning and teaching. In addition, Vygotsky’s Social learning theory resonates with me and causes me to view the process of learning in an altogether different manner than I have previously done so. Although a number of principles from competing or even opposing theories have also influenced my personal practice, it is the principles from constructivist theory, Vygotsky’s social learning theory, and the making of connections illustrated in these theories, that most accurately reflects my own personal theory of practice.

As a result of this, learning, for me, is all about making connections. Whether it is making connections in the head, connections with curriculum or connections with community, learning can be summed up in this deceptively simple phrase.

I believe that the effective organization and delivery of curricular content plays a significant role in helping learners make the connections necessary for the assimilation of new information. Connecting the new to what is known, is essential for learner’s to construct meaning.

The interpersonal aspects of connection also influence my personal theory of learning and by that, my practice as an educator. Much of what we are, and much of what affects our approach to learning, can be traced back to the interpersonal connections we make. Those we chose to emulate, the culture we grew up in and the attachment relationships that we develop all play significant roles in how
and what we learn. Relationships have become of great importance to my instructional practice because of this significance. The formation of healthy connections between all participants in the learning environment contributes to the learning process.

Part of creating these healthy interpersonal connections is the process of effectively connecting behaviour to consequence. All participants in the learning environment must be aware of how their behaviours enhance or detract from the process of learning. As an educator, I intentionally and actively seek to shape and modify the behaviours of all participants, including my own behaviours, to better facilitate the process of learning.

In every aspect of my personal theory of practice, it is connection that makes learning possible. Through the application of several key principles of established learning theory my professional practice has been altered to reflect this centrally unifying belief.

**Supporting Principles**

**Learning Principle #1**

**The Cognitive Connection: Connecting New to Known**

Learning is about making inroads to a learner’s pre-existing internal framework. The responsibility of the learner and the challenge for the instructor is to connect what is new to what is known.

*Piaget’s Three Processes of Development*

Piaget’s development theory contends that children move through a number of developmental stages as they mature cognitively. He also “considered three processes as being critical to development: assimilation, accommodation and equilibration” (Driscoll, 2005, p. 198). Central to each
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of these processes is the connection made between what is believed to be known and what is recently learned.

*Assimilation* is the process of connecting new information to existing schemes, *accommodation* is the process of modifying existing schemes to accurately connect new information, and *equilibration* is the process of restructuring existing schemes to account for discrepancies in thinking that cause the creation of connections through assimilation and accommodation to be logically impossible. It is the “master developmental process” (Driscoll, 2005, p. 199) of equilibration that moves learners from stage to stage.

The connecting of what is new to what is known is central to cognitive maturation in Piaget’s developmental theory.

*Meaningful Learning Theory, Schema Theory and Schema Connection*

Though Ausubel’s meaningful learning theory and Schema theory differ on the nature of schema, they agree on the need for anchoring new information to existing schema. Ausubel asserted that schema were hierarchical structures that learners used for cognitive organization. Learners connect new information to existing schemata utilizing subsumption, superordinate learning and combinatorial learning (Driscoll, 2005).

Schema theory identifies a schema as “a data structure for representing the generic concepts stored in memory” (Driscoll, 2005, p. 129). These data structures use schema instantiation or the input of values (schemata) into the variables of the data structure, when applied to specific situations. Through the processes of accretion (the adding of new acceptable values to certain data structures), tuning (the evolving of data structures to accommodate experience) and restructuring (the creation of
new data structures to accommodate experience), new information is connected to pre-existing schema structures (Driscoll, 2005, p. 135-6)

Both theories rely on connecting new information to pre-existing schema, either through linking that information to anchoring ideas or by inputting new information into relevant data structures through the process of instantiation. In both theories, it is this connection of new to old that facilitates learning.

**Cognitive Information Processing and Long-Term Memory**

"Adherents of the CIP model ... explain how the environment modifies human behavior ... [assuming] an intervening variable between environment and behavior. That variable is the information processing system of the learner" (Driscoll, 2005, p. 74). The CIP model is concerned with the processing or flow of information through the stages of memory - sensory memory, working memory and long-term memory - and the successful retention of information within the long-term memory. Two key features of CIP’s proposed information assimilation, selective attention and pattern recognition, play significant roles in moving information from sensory and working memory to long-term memory.

Similar to Piaget’s processes of development and schema theory that stress the connection of new information to existing schemata, the CIP model also emphasizes the making of these meaningful connections. In the CIP model this is accomplished by providing “a meaningful sequence or structure to the material a learner must encode” (Almaguer, n.d.b, ¶ 2). Through signaling what information is important and drawing attention to specific features instruction can “facilitate selective attention and appropriate pattern recognition” (Driscoll, 2005, p. 104) and by that the assimilation of new information. The CIP model explains how to assist learners in making cognitive connections to new
information and also illustrates the importance of connecting the new to the known as a fundamental principle in learning.

**Learning Principle #2**

**Organizational Connection: Using Graphic Organizers**

Using graphic organizers in the presentation of information or for information gathering in the formative stages of learning enhances the connection of the new to the known.

*Ausebel’s Meaningful Reception Learning*

Ausebel asserted that “meaningful learning [is] the process of relating potentially meaningful information to what the learner already knows in a nonarbitrary and substantive way (Driscoll, 2005, p. 116). Comparative organizers allow the learner to organize information in these nonarbitrary and substantive ways. A comparative organizer "provides a means for systematically comparing and contrasting concepts" (Driscoll, 2005, p. 144). Having learners generate them using pre-developed forms provides a "means of facilitating the learning of unfamiliar, and potentially confusable, information" (Driscoll, 2005, p. 144). In addition, the inclusion of comparative organizer forms helps make "similar concepts more easily discriminable" (Driscoll, 2005, p. 144).

If one subscribes to a constructivist approach to learning then the organization of information in ways that facilitate cognitive assimilation is a fundamental principle that should be applied to instruction.

**Learning Principle #3**

**Prepared for Connection: Advanced Organizers**

Learners need to be ready to learn. They may have all the prerequisite skills and the curriculum may be designed particularly for their level of understanding but learners also need to know what it is
they are learning. Learners need a roadmap to effectively negotiate the delivery of information so that they can employ the appropriate assimilation skills and extract the salient points of the content presented. Advanced organizers act as roadmaps connecting where the learner is to where they are headed.

*Ausubel’s Meaningful Reception Learning*

One of the most important conditions for Ausubel’s meaningful learning to take place is connecting what the learner already knows to what they are asked to learn. Ausubel asserted that “to be ready to for learning new material … learners of all sorts must possess a relevant, stable, and organized cognitive structure” (Driscoll, 2005, p. 125). However, if “cognitive structure is unstable, ambiguous, disorganized, or chaotically organized, it tends to inhibit meaningful learning and retention” (Ausubel et al., 1978, p. 164). To combat this condition, Ausubel argued that “learners with poorly organized cognitive structures in a subject matter should be aided in learning by materials that make clear similarities and differences among concepts to be learned” (Driscoll, 2005, p. 124). This is effectively done by utilizing advanced organizers that serve to bridge the gap between what is new and what is known through presenting a clearly organized structure that a learner can adopt to facilitate the assimilation of new material in a well-ordered fashion. It is the enhancement of the assimilation process gained that establishes the use of advanced organizers as a key principle to a well-structured learning environment.

**Learning Principle #4**

**The Social Connection: Socially Mediated Learning**

Learning is not done in isolation. Learning is a communal process that relies on social interaction to facilitate its development. Social interactions not only express our cognitive processes
but they shape them as well. The patterns that learners identify and make connections with, patterns like language and behaviour, are socially anchored. The importance of social connection to cognitive development has been promoted in numerous theories.

**Jean Piaget and the Acquisition of Social Knowledge**

Piaget asserted that children's interactions with their peers are an important source of cognitive development. Piaget distinguished between three types of knowledge that children acquire: physical, logical-mathematical and social knowledge. He states, “social knowledge is culture-specific and can be learned only from other people within one’s cultural group” (Driscoll, 2005, p. 193). Social knowledge such as language, moral rules, values, historical narratives and symbol systems are directly tied to the connections made between individuals and dependent upon social interaction.

**Lev Vygotsky’s Social Cognition**

Vygotsky proposed that social interaction is at the core of all learning. It not only allows a child to “acquire much of the content of their thinking, that is, their knowledge” (Funderstanding, 2001, ¶2) but it also “provides a child with the processes or means of their thinking … In short, … culture teaches children both what to think and how to think” (Funderstanding, 2001, ¶2). Vygotsky believed that cognition was a group process - what is identified as distributed cognition. According to Vygotsky, whom we interact with and how we interact shapes not only what we think about but also the very way we think. Those connections we make in the social arena fundamentally alter our cognitive development. For Vygotsky, this social connection facilitates the cognitive connection required for learning. In my own teaching this has been glaringly apparent causing me to adopt socially mediated learning a fundamental principle of learning.
Learning Principle #5

Consequence Connection: The Stimulus/Response of Behaviour Modification

Central to any socially mediated learning task are the behaviours that negotiate successful interaction between participants. The process of developing the appropriate interactive behaviours in the structured environment of a public school classroom requires the application of behaviour modification techniques that clearly connect the relationship between behaviour and consequence. By creating the conditions where learners make the connection between their behaviours and desirable results, teachers can elicit preferred and supportive behaviours that augment the learning process.

B. F. Skinner and Stimulus Response

B. F. Skinner “believed that behavior could be fully understood in terms of environmental cues and results” (Driscoll, 2005, p. 33) or, by the connection between stimulus and response. His classical conditioning asserts that an organism’s response can be shaped by a stimulus but only if a connection between the two is made. Skinner’s basic S-R-S relationship of discriminative stimulus, operant response and contingent stimulus illustrates this connection process. The nature of the contingent stimulus determines what happens to the response. “Behavior is more likely to occur if it has been rewarded” (Driscoll, 2005, p. 35). The effective creation of this connection is what Skinner focused on.

By controlling the immediacy of the response and the type of a response that an organism received for a particular behaviour, Skinner demonstrated that he could make a learning connection and either strengthen, weaken or even extinguish a selected response.

Learning Principle #6

The Physical Connection: Artifact Mediated Learning
The inclusion of culturally relevant and applicable artifacts in a learning environment is essential to the effective delivery of instruction. Learning is fundamentally shaped and defined by the physical artifacts and processes employed in its delivery. An artifact’s employment in the learning process becomes inseparable to the learning taking place. Because of this, it is important to mediate learning with culturally relevant and applicable artifacts that reflect the artifact usage in the broader culture where the learning is being delivered.

Artifact Mediated Learning

One of Vygotsky’s most defining theoretical propositions is that of artifact mediated learning. This simply refers to the importance of cultural artifacts in the cognition process. Vygotsky argued that, “artifacts clearly do not serve simply to facilitate mental processes that would otherwise exist. Instead, they fundamentally shape and transform them” (Cole, p. 2). In light of this, the selection of the artifacts employed in the learning process becomes of the utmost importance. By choosing one artifact over another an instructor “abolishes and makes unnecessary several natural processes, whose work is accomplished by the tool” (Cole, n.d.). The implication for instruction is that both the processes being replaced and the new processes being learned need to coincide with the process requirements of the society in which the instruction is taking place. Artifact choice in the learning process needs to reflect the employment of artifacts in the relevant culture.

Learning Principle #7

Internal Connection: External to Internal

The process of learning, especially in the elementary grades, is one that involves moving the learner from explicit, concrete and external processes to implicit, abstract and internalized processes. Young learners in particular require the physical model before the mental model can be formed.
Instruction that fosters the connection between external processes to representational, internal processes is paramount in establishing a healthy learning environment. Instruction should be designed to provide the learner extensive and variable practice with external, concrete and explicit instruction that eventually develops more internalized mental models and processes.

_Lev Vygotsky and Internalization_

Vygotsky contended that “any higher mental function necessarily goes through an external stage in its development” (Driscoll, 2005, p. 252). At the core of Vygotsky’s social learning theory is the essentialness of social relations and how artifact mediation facilitates the conversion of social relations to psychological functions. In essence, he asserted that the external process become internalized processes through the use of signs where “a sign something that stands for something else” (Driscoll, 2005, p. 251). Learners originally learn to use concrete and explicit tools that eventually can be replaced by internalized and symbolic representations. “Higher mental processes are created, then, when mediation becomes increasingly internal and symbolic” (Driscoll, 2005, p. 252).

_Jerome Bruner’s Three Modes of Representation_

Bruner also believed that learners needed to “acquire ways of representing the recurrent regularities in their environment” (Driscoll, 2005, p. 228). Although Bruner believed that cognitive growth was a two-fold process, “from the outside in as well as from the inside out” (Driscoll, 2005, p. 228), it is his first assertion that supports the adoption of the process of internalization as an important learning principle. Bruner suggested that this internalization was done through three modes of representation: enactive (the representation of understanding through motor responses), iconic (the representation of understanding through images) and symbolic (the representation of understanding
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Although Bruner did not believe in age specific developmental stages, he "believed in the invariant sequence of stages through which children pass" (Driscoll, 2005, p. 230). He also noted that even "adults typically require a certain amount of motoric skill and practice before they are able to develop an image representing their actions" (Driscoll, 2005, p. 231). Thus, Bruner supported the assertion that learning, as a process, requires moving interaction from the external progressively to the internal.

Jean Piaget’s Stages of Development

Piaget’s stages of development also support the adoption of the process of internalization as an important learning principle. As children move through his stages of sensorimotor, to preoperational, to concrete operational and finally, to formal operational, they shift from concrete mental operations to increasingly more symbolic mental operations. This is illustrated most clearly in the formal operational stage where students’ mental operations are no longer bound by concrete representations but “become more abstract so that the individual can reason, not just with objects, but with formally stated premises or propositions” (Driscoll, 2005, p. 197). It Piaget’s process of moving from reasoning with external objects to internal symbols that supports the acceptance of internalization as an important learning principle.

A Change in Practice

Instructional Change

The connecting of what is new to what is known is an essential feature of Piaget’s three processes of development, Ausubel’s Meaningful Learning theory, Schema theory and CIP theory. The implication for instruction is the demonstrable need for the organization of content to facilitate this connection. I have incorporated this fundamental principle in my teaching through the use of inductive
teaching strategies, through the use of advanced organizers, and through the application of graphic representations to organize content.

Through the use of inductive teaching strategies such as concept attainment (Bennet, 2001), where students figure out the attributes of a group or category by comparing and contrasting examples that contain the attributes of the concept with examples that do not contain those attributes, I have found that I can provide opportunity for children to be made aware of conflicts and inconsistencies in their thinking and encourage the refinement of existing schemata.

Similarly, the demonstrated value of advanced organizers used to enhance the assimilation of new information to existing schema has convinced me to incorporate this as a component in my own instruction. Providing a visual framework of what is to be learned increases the likelihood that the salient points of new concepts will be effectively assimilated into existing schema.

Finally the use of graphic representations such as webs, concept maps or semantic maps, also provides a visual framework for the efficient assimilation of what is new to what is known. Currently I utilize mind maps and other organizers to a limited degree but I see the importance that these organizers have in arranging content in ways that better provide for learner assimilation.

Through the effective application of the principle of connecting what is new to what is known, my instruction has been organized to better facilitate the process of cognitive connection.

Social Change

The theories of Piaget and Vygotsky illustrate the importance of social connection to cognitive development and support the identification of social connection as a key learning principle. The implications for my own instruction have been to encourage peer teaching and social negotiation during problem solving through the fostering of cognitively supportive social connections between
peers. The inclusion of learning support groups and instructional strategies such as Think-Pair-Share (Bennett, 2001, p. 105) have emphasized social negotiation as a key component in learning by providing students opportunities for peer feedback and support, which in turn offers children effective ways to validate the logical connections they make. The formation of these cognitively supportive peer relationships facilitates the process of learning.

Application of Vygotsky’s principles in my personal practice has taken other forms. One in particular is that of reciprocal teaching as applied in the Literature Circles I use for reading comprehension. Literature Circles are “student-led book discussion groups [where] students choose their own reading material and meet in small, temporary groups with other students who are reading the same book” (Educational Oasis, 2005). Here students are assigned jobs and participate in comprehension strategies that include “questioning about the main points in the passage, clarifying to resolve difficulties to understanding, summarizing to capture the gist of the text, and predicting to forecast what might happen next” (Driscoll, 2005, p. 259). Following my example, students take turns assuming the role of instructor and lead others through their completed comprehension activity. Through this process, the social connections formed support the cognitive connections required for learning to take place.

Management Change

Skinner’s theories are still widely applied in behaviour management programs worldwide and in my own classroom experience. The concepts of positive and negative reinforcers find particular application. “Historically, people have been controlled primarily through negative reinforcement that is, they have been punished when they have not done what is reinforcing to those who could punish them” (B. F. Skinner Foundation, 2005, ¶ 14). Although Skinner identified punishment as an effective
tool for behaviour modification, he introduced the idea of reinforcers. Skinner’s positive and negative reinforcers do not suppress or decrease the likelihood of behaviors as punishment does, but rather strengthen them.

As already stated, I utilize a lot of socially mediated learning processes and have students work in groups. Some students demonstrate consistent difficulty with group work. They do not display the appropriate behaviours required for group work to be successful. To deal with this I assign these students to a teacher monitored group. By identifying target behaviours outlined in direct instruction I set up a plan to move students from being involved in a teacher monitored group to an independent group. As students display the behaviours required, my direct control of the group lessens. Direct correlation between my gradual removal and the display of behaviours is explicitly identified. Eventually, these groups are able to work on their own. The success of this strategy is based on the combination of positive reinforcers (independence) and negative reinforcers (removal of direct teacher control) as well as immediate feedback. The connections students make between their actions and the results allows for the successful shaping of their behaviour.

The principle of connecting behaviour to consequence, is a central theme in Skinner’s classical conditioning. Although very effective, it has, some limitations. Skinner argued that we must examine behaviour “in relation to the environmental events surrounding it” (Driscoll, 2005, p. 34) and that we must control these environmental events to shape behaviour. The environmental influences that affect student behavior extend far beyond the immediate classroom. Home life, cultural background and many other uncontrollable factors make a strictly behaviorist approach to classroom management problematic. A teacher simply cannot control all the factors. However, used with these limitations in mind, behaviorist approaches provide teachers the means with which to help students make the connections between behavior and consequence that allow for effective behaviour management.
Through the thoughtful application of several principles found in established learning theories and especially those in constructivist and social learning theory, my professional practice as an educator has been shaped and altered. It is my belief that “learning is about making connections”, that ties these various principles into a unified theory of practice and directs their application in the curriculum I select, the methods of delivery I employ and the environment that I create to facilitate the process of learning or, more appropriately, the process of making connections.
References

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