Strengthening Practice with Theory

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ABSTRACT: This article constructs a theoretical framework for the component of developmental education related to how students learn by making connections across disciplines. Theories from fields including psychology, linguistics, cognitive science, reading, and adult education are organized into the following sets of concepts: the construct of intelligence; different ways of knowing; the nature of constructivism; the active, strategic process of learning; metacognition; and the cultural imperatives that can affect learning. Student case studies are utilized throughout the article to clarify connections between theoretical foundations and the teaching and learning process.

The field of developmental education is strong in part due to the range of disciplines represented by its practitioners. Developmental educators come from a multitude of backgrounds including psychology, student development, reading and adult education to name a few. This multidisciplinary foundation may be applied an integrated approach to educational practice. This integration could be further enhanced by constructing an interdisciplinary theoretical framework. Such a framework would serve as a standard point of reference for training new practitioners and for facilitating decision making in the field. It would also help to ensure that practices are not randomly implemented and, as a result, could increase communication and collaboration.

This article begins to construct a framework for practice by exploring theory related to ways of knowing. This includes taking a new look at how intelligence is defined and levels of thinking and reasoning. It also considers how learners think about what knowledge really is and how it is acquired.

Looking at Some of Today's Learners

In order to more easily integrate theory with practice in the article, three students are introduced and utilized as a living context to illustrate integration. They characterize many of the learners enrolled in postsecondary educational systems today. Through descriptive narratives, students' general circumstances, goals, and backgrounds are detailed; they each embody many features of the students we work with daily. As you read their brief histories, you will probably find that they share much in common with the students you encounter regularly.

These three students will serve as case studies throughout the article to clarify connections between theoretical foundations and the teaching and learning process. Readers are encouraged to reflect on your students to try and make similar connections and to assist a relevance and clarity that may come with the concrete applications offered.

Descriptive Narratives of Students

Eva: Case Study #1

Eva is a former ESL (English as a Second Language) student who has recently completed her English language course work. She had been living in the U.S. for 1 year when she first enrolled at Urban Commuter University (UCU) 3 years ago. Before that, she had immigrated from Poland with her family

to join extended family members who lived in a large metropolitan area of the Midwest. Eva spoke little English, and her parents spoke none at all. Since they lived in a Polish-American community where it was easy enough to find jobs for which English was not required, learning English was not a priority.

After 1 year, Eva began to feel the restrictions associated with her job in the neighborhood and the missed opportunities due to her lack of English. She discovered through friends that UCU had a good ESL program, but she was a little apprehensive. Her family did not see the need for her to leave the community; after all, she had a good job and a secure environment. After much encouragement from her friends, however, she went to UCU and was assessed by the ESL faculty. They placed Eva into level one of the five-level English language program, and she diligently worked her way through all five levels.

It took her almost 2 years to complete the course work attending classes in the evenings. She worked full time during the day and joined her growing group of young classmates in the evenings. More and more, she looked forward to meeting them for dinner to practice her English before going to class. Eva was finding less time for her family, and when she was home she spent most of her time studying. As much as she wanted to help, she became increasingly resentful of the additional family responsibilities she had to assume due to her increasing proficiency in English. She also wanted to speak English while at home, and she offered to help her parents learn. She found, however, that speaking Polish provided a comfort zone and a tie to their heritage that her family did not want to give up.

Shortly before completing the fifth level of English study, Eva moved into an apartment downtown with some of her friends. She found a new job near school where she had to speak English, and she chose a program of study at UCU that would lead to a career in Medical Technology. Although she was excited and extremely proud of her accomplishments, her family did not want to talk about it and spoke very little when she came home to visit.

Mike: Case Study #2

Mike went to work full time at his uncle's auto body shop after his graduation from high school. High school had seemed pretty easy to Mike; after all, based on standardized test scores he had been advised at the beginning of his freshman year to focus on vocational/technical courses, and as he grew up he had spent a great deal of time in his uncle's shop. He felt very comfortable in the shop atmosphere of vocational classes and often felt that he knew more than the teachers. Mike and his friends, in fact, developed a reputation for being confrontational and difficult both in and outside the classroom. Their attitude was that they were already doing "real" work in their part-time jobs as mechanics, and there was nothing relevant going on at school. Mike rarely did homework and often skipped class or was asked to leave when he became too disruptive. Teacher expectations were low, however, so, in spite of this, he passed all his classes and graduated in 4 years.

This experience in high school left Mike with the feeling that formal education was for others; he would rather learn on the job where the work was exciting and fulfilling. He worked long hours for his uncle, and, because of his dedication and growing expertise, the customers often personally asked for his service. At the end of 2 years he was working "on the side" for so many customers that his work week had stretched to an average of 65 hours. He began paying his friends to help him out with the extra work and eventually rented space in an empty garage down the street from his uncle's where he worked evenings.

Facing pressure from his friends to cut down on his hours, Mike decided to leave his uncle's shop and direct his efforts toward developing his own business. He figured that he already had plenty of

customers and good, dependable help from his friends. What he didn't have, and didn't know he needed, was formal training in the various components of running a small business. He knew his trade, but he needed a framework for budgeting, marketing, accounting, and training. The first year was tough because he had to depend on others for this expertise. Many of his friends left because he wasn't able to pay them on a regular basis, and Mike became frustrated when he couldn't adequately communicate with his employees.

Mike asked his uncle for advice and, after listening to him, decided to go back to school in the evenings and take a few classes. He registered for an accounting class in the continuing education program at his former high school where he immediately began to experience the assignments as irrelevant. He struggled with the math examples from the text and wondered what they had to do with his goal of running a business. All of this led to a return of the feelings of frustration and inadequacy he previously experienced in high school.

Anna: Case Study #3

Anna graduated from college with a 3.5 GPA in English Literature and went to work for a small company that specialized in corporate training. Her job was to write up the training proposals that were sent out to potential clients; she primarily worked alone and at her own pace. She was quite successful, and her interest in writing continued to grow. After 10 years Anna grew tired of this position and also felt that she needed to spend more time at home raising her two children.

She decided that returning to graduate school might be the answer; it might provide her with the opportunity to refocus her career and at the same time allow her to meet the increasing time demands of her young family. She found a graduate program that seemed to be a good fit; it had a writing specialization and also offered the option of delivering the instruction through an an interactive video delivery system. That meant Anna would not have to spend time driving the 30 miles to class; rather, she could simply go to the interactive video classroom at the local community college and be connected to her classmates and teacher through a video camera. All instruction originated from the primary site, and most of the students attended there; in fact, Anna was the only one actually present in the local community college classroom during the time of instruction.

Even though Anna had no prior experience with technology, and the monitors and cameras scared her a little, she welcomed the opportunity to be a part of this new distance learning process. She quickly learned how to work the controls and participate in discussions. She had always been resourceful and independent, so she was accustomed to figuring things out on her own. Soon, however, she began to notice the informal conversations going on among her classmates before the teacher arrived. And even though she was always included in group projects and activities, she felt a little like an outsider as she watched the others handling and distributing the materials for a presentation that she had helped to create.

One evening, the teacher invited a guest speaker to class who had never experienced an interactive delivery system. Anna was present via the video link, but the speaker kept forgetting about her and rarely looked in her direction as she spoke to the group. Anna was able to ask questions at the end, but still it was unsettling to feel so removed. It was then that she decided to make the 30- mile trip and attend the next class session at the primary site. She had never met her teacher or classmates face-to-face, and she felt that she needed that connection.

Connecting the Theory

If we "take these students along with us" as we look at some theoretical constructs, the theory may seem more relevant and directly connected to the teaching and learning process. By continuously asking questions raised by the various theories and then critically reflecting on how they could directly enhance the learning and development of these students, the reader can begin to experience the value of integrating theory with practice.

Chances are that when we prepare to teach a class or lead a workshop, we design instructional materials that fit our own ways of knowing. We may even reflect on what has been most effective in our personal learning experiences and, feeling comfortable with it, adapt it to the subject at hand. For instance, if we have always found visual reinforcement helpful, we probably enter the classroom armed with a folder of carefully constructed overhead transparencies. If we go beyond this, our preparation may include what we have heard at the latest professional conference where research from a presentation has confirmed that the lecture is dead and collaborative learning is the way to go. With this information, we systematically design small-group activities and let the students work on their own. After all, we believe that knowledge isn't simply transferred from us to our students through lecture and note taking; knowledge is built by connecting new ideas to experience and integrating others' thoughts with our own. Or maybe our colleagues have suggested that there is one particular method that works best for our discipline. In a workshop on time management or in a chemistry lab, for example, there may be a "tried and true" set of materials developed around a formula that is believed to work for everyone.

What these assumptions are missing is a theoretical framework that can inform educators about the learners' different understandings of what knowledge is and also how they approach the task of learning. Once we have a better idea of the variables affecting the many ways of knowing, we can construct a more effective range of instructional approaches to meet the needs of the increasing variety of learners pursuing their further education.

Let's first take a look at Mike and what has been effective for him as he developed into a sought-after mechanic. He seems to be most successful when he is involved in an environment that is relevant to his interests. Brown, Collins, and Duguid (1989) suggest that learning is highly effective when the learner is engaged in realistic, "messy" problems rather than those that are more linear and predictable as is the case so often in formal educational settings. From their research with "Just Plain Folks," they conclude that cognitive apprenticeships in which the learner is engaged in authentic activities in a relevant context help to foster learning. For Mike this suggests that he might learn best through an internship or independent study situation with a plan of study that includes at least several hours a week at a work site under the guidance of an expert in the field. If this is not possible, perhaps a simulated work environment where in-class teams design a business plan and then are expected to find solutions to realistic problems associated with their "own" businesses would better fit Mike's learning needs.

If Mike were engaged in such a learning environment, his practical intelligence would be highlighted and perhaps serve as positive reinforcement that would further motivate him to come to grips with more abstract concepts and ideas associated with his vocational interest. In other words, he may not do well in the analytic tasks required of him in school, but he excels in an environment in which practical performance is valued. Tennant's notion of tacit knowledge (Tennant & Pogson, 1995) supports this concept. He contends that adults develop expertise in domains indirectly through experience. Often they are unable to articulate their knowledge base, but rather they depend on an implicit memory that does not diminish with age. He refers to the importance of procedural rather than declarative knowledge. Howard Gardner's (1983) ideas may also help our understanding of how to help Mike. His theory of multiple intelligences describes an intelligence as a set of tacit knowledge related to performance in a

particular domain. Gardner outlines seven intelligences; Mike may be strong in several of them including bodily-kinesthetic and interpersonal abilities.

Another factor related to Mike's lack of success in a formal learning setting seems to be the stress that it elicits. McLeod (1996) theorizes that when fear and stress are present, hormones may be released that actually interfere with meaningful learning. He refers to the presence of a "Deep Learning State" that occurs only when the brain's neurotransmitters are open and there is a more efficient flow of information. The learning environment can act as a stimulus that determines which mode the brain enters.

In the case of Mike, he may be so fearful that he actually is not able to take in the information during class that he needs in order to further process it for learning. If this is the case, it could interfere with his ability to input and store material for later use. Such an information processing model in which learners take in information from the external world through their senses has been described by Bruer (1993). After initial intake, information is subsequently processed in working memory where decisions are made regarding its usefulness. From here, information is either sent on to long-term memory or used for immediate output to answer a question in class or make a response to an instructor's comment, for example. It is in the working memory that Bruer describes a possible "bottleneck in our cognitive system" that may occur if it becomes overloaded. If this overload is not managed efficiently, the learner probably will not progress from lower level to higher level skills (p.15). Due to his high level of stress, Mike may be unable to make the necessary decisions that determine where information is directed. Consequently, he may not forward information to his long-term memory systems or, if he does, he may be too anxious to manage an organized storage system from which he can retrieve it when needed.

Emotions such as those related to the anxiety of Mike can also contribute to one's cognitive processing in a positive way. Mayer and Salovey (1997) have described this concept as emotional intelligence. They define it as a developmental process that starts with learners perceiving and accurately expressing needs related to their emotional state and moves to a level with individuals consciously regulating emotions and reflecting on them regularly. In the case of Anna, she seems to be able to understand and to express her needs related to distance learning. She understands that her feelings of isolation and lack of involvement stem from her physical separation from the larger group of learners. She does not attach these feelings to resentment toward the instructor or to any inability to understand the content. It is likely that Anna has moved through level two of Mayer and Salovey's emotional intelligence development as she has allowed an analysis of her feelings to help her direct attention to the significant variables in the situation; she appears to be a learner who enjoys collaborative processing, and she realizes that she must change her environment in order for that to be satisfied. If she were at the highest level of emotional development, Anna would be able to consciously detach herself from the negative feelings she attaches to the off-site approach to instruction by reflecting and concentrating on the positive, utilitarian aspects of it which led her to enroll in the first place.

Anna is in the process of adapting to her environment based on a personal understanding of her emotional state. This experience leads us to Sternberg's (1988) triarchic theory. He contends that intelligence consists of three components: analytical, synthetic, and contextual. The analytical piece is perhaps best reflected in traditional approaches to learning in a more formal setting. There the learner frequently processes information by analyzing how to solve a given problem and then monitoring and evaluating the effectiveness of the solution. Following this, the solution is implemented, and subsequently knowledge is acquired by sorting out the most relevant information for storage and connecting it to prior knowledge. The process here follows a linear format and is characterized by an

internal, mental methodology.

Anna has always been successful using this type of process, as measured by her standardized test scores and consistently high grades in college. For Mike, however, this area causes the most trouble. He is not particularly interested in learning through an internal, mental analysis of information that is presented to him. This could account for his low grades and for low performance on standardized tests. Mike's performance in the second area, synthetic, is probably higher. Here is where many traditionally high achievers in school experience difficulty; they cannot go beyond what is given them in order to create solutions for novel situations. The internal world of mental processing often collides with the external world of messy, complicated situations where neatly learned solutions don't work. Mike's ability to deal effectively with the daily problems of his business indicates his strength not only in this second component but in the third piece of Sternberg's (1988) theory, the contextual.

This contextual piece is where one is able not only to adapt successfully to the everyday world but also to go beyond adapting to actually selecting and shaping the environment. Mike, as we know, has been quite successful in the real world of work and relating to people as clients. He also has experienced taking an active role in selecting and shaping his environment by breaking away from his uncle's business and starting his own. He has understood that, if some of his needs are not being met, he can take the actions necessary to make a change.

The work of Vygotsky (1965) helps the understanding of the significant role played not only by the overall environment but by the facilitators in that environment as well. Vygotsky describes an individual's zone of proximal development as being the area between one's latent ability and realized potential. He has theorized that guided instruction which leads one across that zone is a necessary ingredient for learning and that intelligence wis most related to performance following the mediation of guided instruction. In Mike's high school environment, no one provided the scaffolding necessary for him to cross this zone. He was never challenged and chose to remain in his comfort zone. Eva, on the other hand, received the guided instruction from teachers as well as more English proficient friends as she gradually became more independent and realized her potential. Vygotsky's framework outlining the effectiveness of an external mediator who gradually releases the responsibility of learning to the learner relates to the concepts of collaboration and constructivism.

Although there is no one constructivist approach to learning, most emphasize social interaction and adaptability. To view learning through this lens, it is necessary to rethink the traditional idea of what knowledge is. In the traditional view, knowledge is considered foundational and most often the expert, or instructor, utilizes Friere's "banking concept" (1970) by making deposits into a willing, passive recipient, the learner. The constructivist viewpoint, on the other hand, suggests that knowledge is nonfoundational and is "a socially constructed sociolinguistic entity and that learning is inherently an interdependent, sociolinguistic process" (Bruffee, 1993, p.3). Bruffee discusses this approach as it relates to collaborative learning. He makes the assumption that learning occurs as people talk and work toward a consensus about the knowledge they need for the task at hand. He suggests that when heterogeneous groups of learners work together, the zone of proximal development expands due to the varied experiences of all members in the group and consequently increases the potential learning power of the individual (p.39).

When Eva first enrolled at UCU, she assumed that she would learn English by taking extensive notes and having her teachers correct the grammatical mistakes she made in her papers. She was not prepared for the collaborative peer discussions that took place each evening in her classes. At first she was angry

because she did see how she could possibly learn from other students who also were learning English. She resented her teacher for not simply providing the rules and letting her memorize them. Gradually, as she became more comfortable, she realized how helpful it was to practice the language and listen to others as they practiced also. Through their "sociolinguistic processing," they could actually learn from each others' mistakes and become more independent at the same time.

Related to Bruffee's emphasis on individuals learning from each other is the work of Stephen Brookfield (1986). He has researched adult learners using Witkin's (1949,1950) concepts of field dependence and field independence. Within the field of adult learning, there is often the assumption that self-directed learning is a sign of maturity and that being characterized as a field-independent learner is more likely to lead to success. Field-independent learners are considered to be more analytical, inner-directed, and individualistic and also to have a stronger sense of self-identity; field-dependent learners are extrinsically oriented, in need of external reinforcement, and also in need of more structure from a mediator (Brookfield, p.41). What Brookfield's research has shown is that successful self-directed learners exhibit characteristics of field dependency rather than independency. "Their learning activities are explicitly placed within a social context, and they cite people as the most important learning resource. Peers and fellow learners provide information, serve as skill models, and act as reinforcers of learning and as counselors in times of crisis" (p.44).

Looking back at Anna's plight, we see that she is expected to be self directed as she sits at the far end of a camera, but she does not feel the connectedness that she needs from her peers. She needs their reinforcement and more direct opportunities to collaborate in order for her to effectively process information. The distance from the primary site acts as a barrier to her learning.

Constructivism has much to do with how the learner understands what knowledge is. This has been reflected in reading comprehension theory. Schraw and Bruning (1996) discuss readers' implicit models of reading and explain how the different perspectives regarding knowledge that one brings to the task of reading determine how one attempts to understand. The transmission model involves the reader acting passively with the purpose of simply extracting information from the text. This sounds like the perspective that many developmental learners bring to studying, probably as a consequence of the positive reinforcement they may have received in high school for memorizing facts and then restating them on tests. More than likely, they may also rely on the translation model which involves readers finding meaning only from within the text: They decode the message without connecting it to previous knowledge or experience. If instructors do not encourage students to interpret information, the students simply may not consider it their right to evaluate it critically or to raise questions about the material as it relates to their own experiences. The students' understanding of knowledge is often that someone else "has it" and they need to collect it. This may explain, in part, why Mike has so much trouble relating text-based information to his actual work.

However, if Mike's instructor showed him how to ask questions before reading, it could encourage him to relate the text to what he already knows and to what he needs to know. From there he might move into an active transaction with the author of the text. The third model of reading comprehension discussed in Schraw and Bruning (1996) connects directly to a constructivist point of view and is called the transactional model. The constructivist perspective assumes that comprehension results from a reader who actively engages in the process of building meaning by setting goals and purposes and relating new information to prior knowledge. They contend that most readers are not conscious of the perspective they bring to the reading task and that this often leads to their comprehension being author or text centered. This implies that instructors need to provide some direct instruction on how to read a

text before making assignments to encourage active reading. They could direct students to set a purpose for reading by outlining critical questions beforehand and directly articulating expectations for connecting new material to prior knowledge.

Mezirow (1991) has introduced the concept of "meaning systems" which act as filters through which learners take in information and try to make sense of it. These systems are constructed by individuals based on their own personal experiences. Learners use their experiences to develop sets of beliefs, theories, and assumptions. These, in turn, become the filter through which incoming information is processed. If they are distorted and organized without careful thought, or critical reflection as Mezirow describes it, then new experiences will be processed through the same "distorted" filters. Eva and Mike embrace two very different meaning systems when it comes to formal schooling. For Eva, school was the obvious place for her to go when she decided to learn English. It never occurred to her to learn on her own or through social interaction in more informal settings. Mike, on the other hand, has experienced his most relevant learning on the job, outside the formal setting of school. He had to experience a crisis to return to school. The two very distinctive meaning systems provide the filter for students' attitudes toward school. In order for Mike to have a meaningful experience at school, his instructors will need to understand this and address it. Mike will need to engage in a process of critical reflection regarding his goals and how best to connect his work to school rather than seeing them as two separate environments.

Cross and Steadman (1996) also talk about this and refer to it as schemata. Without schemata, learners would have to rely on memorization for learning. The authors provide a good image for this by the description, "Our existing knowledge base is the Velcro of the mind to which new information sticks. However, in the same way that lint can keep Velcro from sticking, misconceptions in a schema can interfere with connecting new information to existing knowledge" (p.41).

Some of these ways of knowing and various understandings of what knowledge is can be related to the developmental stages through which a learner moves. This notion began with the work of William Perry (1970) when he established his nine classic stages of cognitive development. According to him, learners progressed through four major categories of knowing: _absolutist or dualist_ where they view the world in terms of right or wrong with experts holding the "right" answer; _multiplicity or problematic_ where uncertainty creeps in; _relativism_ where knowledge becomes contextual and learners make their own judgments and _commitment_ which leads to a personalized set of values, lifestyle, and identity. Mike probably functions at an absolutist level when he is in a formal learning situation; he most likely is intimidated by his instructors in part because he sees them as authorities who hold the answers. He becomes frustrated when he cannot seem to find "their" answers, and that is when he returns to the "real" world. In the context of his world of mechanics, his level of knowing may be at the level of relativism as he makes judgments regarding work to be done based on varying sets of conditions. He has sufficient experience and knowledge to know that repairs frequently are personal judgments and not set in stone. Perry's levels are most useful to us if we apply them, not developmentally but within a context, as a way of understanding different thinking patterns.

Whereas Perry's (1970) work was limited to males, Belenky, Clinchy, Goldberger, and Tarule (1986) extended the notion of various ways of knowing to females and found five levels. Even though the researchers did not suggest that these ways were developmental, they have been widely interpreted as such. These positions include _silence_ (where one feels voiceless), _received knowing_ (where knowledge comes from an external source), _subjective knowing_ (where knowing is intuitive rather than based on evidence), _procedural knowledge_ (where procedures for processing information are developed), and

constructed knowledge (where knowledge is considered to be contextual and the knower is part of the context).

More recently, Baxter-Magolda (1992) has looked at college students' ways of knowing and reasoning. She discovered patterns of thinking that were related to, but not dictated by, gender (1992). She argues that attributing characteristics to gender is primarily a social construct and that differences between the sexes result from interactions within particular contexts and also vary within gender. She has identified four stages of ways of knowing that evolve from simple to more complex; within the stages, she has found *patterns* of gender differences. These stages are very similar to those of Perry (1970) and Belenky et al. (1986), but the patterns within them make them significantly different.

At the *absolute level* the learner sees knowledge as held by an external authority. Females at this level tend to function as receivers, taking notes and studying to do well, whereas males function here in a mastering pattern, exhibiting more verbal interaction with the instructor. At the *transitional level* of reasoning the females tend to exhibit an interpersonal pattern, relying on the opinions of others through dialogue and the collection of others' ideas to help construct their own knowledge, whereas the males more often engage in an impersonal pattern, using the opinions of others as material for debate or challenge. At the *independent stage* of knowing females are often engaged in an interindividual pattern; males at this stage tend to use a pattern of independent processing. Within the interindividual pattern, learners have their own interpretations but value an exchange of ideas; on the other hand, the individual pattern focuses more on the learners' own independent thinking. The *contextual level* of knowing, according to Baxter-Magolda (1992), rarely appears during the undergraduate years. Consequently she does not suggest any patterns within this level. It is generally characterized by thinking that one is able to make informed judgments and evaluate distinctions among perspectives.

As Eva began her studies, she viewed knowledge of the English language as something her instructors had and that she needed to "get." She was clearly behaving at an absolute level of thinking as she studiously took notes on grammatical constructions and was very reticent to experiment with the language. She did not understand it when instructors would require collaboration and have students work orally in small groups. She felt this was a waste of time because the others didn't know any more than she did, and she believed she was there only to take the knowledge from the instructor. Gradually, she came to understand that the rules she struggled so hard to memorize from her notes came much more easily if she tried to construct language by actually engaging in it through the small groups. This more developed level of reasoning carried over into her other classes. There she began to experience how her interpretation of the material often helped others to rethink their own positions and vice versa.

Mike will eventually move from the absolutist level of reasoning once he begins to discover the connection between what he does at work and the knowledge being discussed in the formal classroom. When he does begin to integrate his own experiences and prior knowledge to that of the text and the instructors, he will enter the transitional level and most likely challenge both in active debate in order to figure out what he really thinks.

Conclusion

This study has outlined a brief look at theories related to cognitive development and different ways of understanding what knowledge is. In the classic work of Perry (1970), he outlined a hierarchical stage theory with the learner progressing through three major categories of thinking. Belenky et al. (1986) used this framework and discovered through interviewing women that their stages of cognitive

development were somewhat different and not necessarily hierarchical. Baxter-Magolda (1992) studied undergraduates and found that there were gender patterns within broader categories of thinking and that the patterns did tend to build on one another.

Bruffee's (1993) notion of knowledge as "constructed collaboration" led us to think about students as active participants in the learning process. Friere (1970) gave us the dualistic concept of banking versus problem solving to describe the difference between passive receivers of knowledge and those who actively seek answers. Bruer (1993)offered an information processing model for how this happens whereas Mezirow (1991) and Cross and Steadman (1996) described systems that affect the organization and storage of information for use later on.

The notion of different kinds of intelligence has also been examined in the article. Gardner (1983) provides seven talents that individuals possess to varying degrees, and Robert Sternberg (1988) theorized a triarchic model that he contends can be taught. Another way of looking at intelligence came from Mayer and Salovey's (1997) ideas regarding emotional intelligence and the developmental nature of four stages.

Looking back at this framework, some common denominators emerge: Cognitive development occurs in stages, not necessarily hierarchical ones, which may be related to gender; intelligence is not one generalized factor underlying all learning; learning is an active process in which collaboration plays a significant role; and knowledge is at the very least partially constructed by the learner.

These theories raise as many questions as they provide answers. The next step is to engage in a process of critical reflection regarding practices in developmental education to see if they lead to a reconstruction of the principles currently used as a framework .

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Acknowledgement