Ministère de l'Éducation, du Loisir et du Sport
Direction de la formation générale des adultes

SOCIAL CONSTRUCTIVISM : A THEORETICAL FRAMEWORK FOR A COMPETENCY-BASED CURRICULUM

GENERAL BASIC EDUCATION CURRICULUM

COORDINATION

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The purpose of the present brochure is to clarify, in simple terms, the epistemological framework adopted by the Ministère de l'Éducation, du Loisir et du Sport for the curriculum reform of adult general basic education. The framework is that of constructivism, which presupposes that knowledge is constructed through action and reflection on action. The term *social* has been added to *constructivism* in order to underline the social character of situations and contexts that impact on the construction of knowledge by adult learners. Social constructivism thus constitutes the theoretical framework for the curriculum reform.

The first section, entitled **Constructivism**, deals with the question of the construction of knowledge without referring explicitly to the social dimension, although it is always present. The second section, **Social constructivism**, highlights the importance of the social dimension. The correspondence between the epistemological framework and the competency-based approach will be elucidated as it arises.

Constructivism

Constructivism is an epistemological position that claims that people develop their intelligence and construct their knowledge through action, in situation, and by reflection on their actions and the results of those actions. People apprehend and comprehend new situations by means of what they already know and modify their previous knowledge in order to adapt to the new situation. Each adaptation to a situation progressively expands and enriches the network of previous knowledge at their disposal, which enables them to deal with increasingly complex situations.

Constructivism may be more aptly referred to as a theory of knowing (as active) rather than a theory of knowledge (as passive), since action is the motor that drives cognitive development. Constructivism is primarily interested in knowledge in action, that is, in knowing.

In response to the question "What does it mean to know?", constructivism claims that to know is to adapt to the new, it is a matter of acting intelligently with respect to new situations. Intelligence is adaptation to new situations. A person adapts by actively experiencing the environment.

The importance of active experience

A renowned study by Held and Hein (1958) elucidates the difference between active experience of the environment and passive experience. In this study, kittens were raised in darkness for several weeks, then exposed to daylight under controlled conditions. The cohort was divided into two groups. The kittens in the first group were allowed to move about freely and thus their visual experience of the environment was active; those in the second group were attached to a wagon and transported around; they could see their surroundings, but only passively. At the end of the experiment, the second group of

kittens behaved as if they were blind. They were unable to negotiate their physical space and kept bumping into obstacles and falling down.

According to Varela, "this beautiful study supports the enactive view that objects are not seen by the visual extraction of features but rather by the visual guidance of action." (1996, p. 175). In fact, it was only because the first group of kittens was allowed to move around freely, guided by their visual perception, that they experienced their space and learned how to navigate it. In the case of the second group, their seeing was passive and played no role in directing their movements.

In this experiment, it is as if we expected the "passive" kittens to know "from the outside", to observe their environment, to represent it to themselves, and then to apply what they learned. At times we have the same expectations of people. In the past, people were taught how to swim outside of the water. Beginners were suspended in a harness over the water and only lowered into the water once they had mastered the appropriate techniques. Learners were thus placed in a position similar to that of the kittens on the wagon.

In certain pedagogical practices, learners are relatively passive. Passive pedagogy is evidenced in the following exercise used to teach the commutative property of numbers. Learners begin by performing certain routine tasks of the following type : [2 + 3 =5, therefore 3 + 2 = ?]; [4 + 5 = 9, therefore 5 + 4 = ?] and so on. This practice is repeated for a certain length of time, at which point the teacher informs the learners that the order in which numbers are added does not affect the result and that this is called the law of the commutativity of addition. Along the same lines, adults are often taught the rule in some form of programmed learning task (see Table 1).

Table 1. Commutativity as taught by linear programmed learning methods (from De Montmollin, 1971).

1.	2 + 4 = 6, therefore 4 + 2 = ?	
2.	9 = 4 + 5, therefore 9 – 5 = ?	6
3.	a + b = c, therefore b + a = ?	4
4.	x = y + z, therefore x = z + ?	c
5.	The order in which numbers are added does not affect the result. This is the law of the commutativity of addition. According to this law, b + a = a + ?	y
6.	The fact that x + y = y + x is called the law of the commutativity of _____.	b
7.	The fact that y + z = z + y is called the law of the _____ of addition.	addition
8.	The sum of three or more numbers remains the same, no matter how we group them: 3+ 4+ 6 = (3 + 4) + ?	commutativity

In the above type of exercise, the learner cannot see the answer, which is provided in the next line and hidden from view by a piece of paper or a ruler. However, the answer is already contained in the information that is provided right before the question. It does not arise as a result of the learner's active experience.

In this example, the learner is relatively passive; all he has to do is to invert the order of the numbers in the first pair of additions, where the answer is already given. Then he has to memorize the definition of commutativity, which is also provided for him. He is not involved in the active experience of using his existing mathematical knowledge in the situation. His experience is more akin to that of the passive kittens or the swimmer suspended in a harness above the water. In short, his learning is restricted to the memorization of information transmitted from the exterior and, once acquired, it is hoped that he will be able to recover it during an exam and eventually apply it in real life.

Here now is a mathematician's story of how he learned commutativity as a child through active experience.

> When he was a small child, he was counting pebbles one day; he lined them up in a row and counted them from left to right and got to ten. Then, just for fun, he counted them from right to left to see what he would get, and was astonished that he got ten again. He put the pebbles in a circle and counted them and once again there were ten. He went around the circle the other way and got ten again. And no matter how he put the pebbles, when he counted them they came to ten. He discovered here what is known in mathematics as commutativity; that is, the sum is independent of the order. (Piaget, 1973, p. xiv.)

In this example, commutativity was learned in action and in situation. The child learned by applying his previous knowledge (counting, aligning the pebbles, forming a circle, etc.). The act of learning was not reduced to an act of memorization. When knowledge is learned in action, it becomes naturally meaningful for the individual and its retention requires little effort. Pedagogy based on constructivism places students in situations similar to those of the child with the pebbles or the active kittens. With the child, as with the kittens, visual perception guides action, in this case, alignment and counting. It does not extract information from the external environment, but rather deals directly with the results of action, the pebbles functioning only as a support to the child's constructive thinking. As the example illustrates, learners begin by performing certain actions; they reflect on those actions and their results; then they return to action, and this dynamic process continues until the concept of commutativity emerges.

To Learn is to Apply Prior Knowledge

Knowing is active: it involves activating and applying one's previous knowledge. New knowledge is always constructed on the basis of what one already knows in action. Knowledge grows out of action and cannot but be expressed in action. We give meaning to situations not by processing information but by activating our actual knowledge in the immediacy of the situation itself. Without such engagement, the situation in which we find ourselves and everything that it includes (objects, people, etc.) are meaningless to us.

Learning is thus first and foremost using what we already know. “Adults, like all learners, do not enter into a formal learning process devoid of any experience; on the contrary, they bring to their learning a vast and wide range of experiences. They therefore have all the prerequisites for learning: **their prior knowledge**.” (MELS : 2005) The first principle of constructivism can be expressed as follows :

All learning is based on prior knowledge.

When I learn how to juggle, I begin with what I already know how to do: throwing balls in the air and catching them. But I soon realize that I can’t give them the proper trajectory and that I am unable to coordinate my actions of throwing and catching. I therefore have to transform my actions, by refining them and coordinating them more appropriately. From this example we can derive our second principle of constructivism :

All learning is based on the transformation of previous knowledge.

The two principles of learning formulated above correspond to Piaget’s two cognitive functions: assimilation and accommodation. Piaget’s own analogy with the digestive system that he borrowed from biology can be used to explain these two functions.

Analogy with the Digestive System

The digestion of food by a living organism involves a dual transformation : a transformation of the food and a transformation of the organism itself.

The transformation of food. Food must be broken down into nutrients in order for it to be digested by an organism. In fact, not everything that is ingested by an organism is incorporated in it, only certain nutrients. The biological notion of assimilation refers strictly to the process whereby nutrients are incorporated in the organism’s physiological structure, without considering the modifications to the organism that this process entails.

The transformation of the organism. Someone who is not used to consuming seafood or spicy food or alcohol will probably experience some indigestion on first try. Drinking the tap water or eating certain meals in a foreign country sometimes results in *turista*. In fact, whenever an organism ingests something unfamiliar, its digestive system must transform itself in order to adjust to what is new and different: for example, it learns to secrete the appropriate gastric juices or to increase its tolerance for spices or alcohol. The biological notion of accommodation refers to this transformation of the digestive system in order for the organism to adapt to something new.

When we feed infants, we give them food that is appropriate to the development of their digestive systems. We do this, for example, by moving progressively from liquids to solids. By adjusting our feeding in this way, we contribute to the gradual transformation of their digestive systems. However, the digestive system is transformed internally, partly as a result of the organism’s growth, of course, but also and especially as a result of its

assimilating and accommodating functions. This illustrates the limitations of our external interventions: we can feed an infant, but we cannot give him a digestive system nor can we assimilate or accommodate on the infant's behalf. This limitation also applies to a person's cognitive system.

From a constructivist perspective, the cognitive system is analogous to the digestive system.

Learning Involves Assimilation and Accommodation

Assimilation and accommodation are also cognitive functions that characterize the process whereby knowledge accesses the unknown on the basis of the known.

From the perspective of these two functions, learning is active in two senses : in the process of learning something new, a person applies his or her previous knowledge (assimilation) and then partly transforms it (accommodation).

Assimilation

At the beginning, individuals can only assimilate something new by integrating it into their existing conceptual network. To assimilate is to make similar : for example, the notion of assimilating immigrants suggests making them similar to the members of the host culture (Zazzo, 1983). The idea is the same for cognition: to assimilate new knowledge is to make it similar to the knowledge one already has. It involves, in a certain sense, transforming the new into the old. Consider, for example, how a word in one language is pronounced differently by speakers of other languages: assimilation involves imposing the phonological patterns of the native language onto the new language. Thus, for example, because the "th" sound does not exist in French, it tends to be assimilated to "t" or "d" ("dis" for "this", "tink" for "think").

Assimilation is the transformation of new knowledge into old knowledge.

Assimilation, therefore, involves a certain degree of distortion. Piaget liked to say that when a goat eats cabbage, it is not the goat that becomes cabbage but rather the cabbage that is transformed into goat. To assimilate is thus to transform the new and to appropriate it in one's own terms, whence the importance of asking learners to interpret a given text, that is, to reformulate it their own words, rather than to simply repeat it verbatim.

Learning involves transforming the new and understanding it in one's own terms

We often say that to learn is to assimilate the subject matter, and by this we mean that the subject matter is memorized as such, without any transformation. Such an interpretation bears no resemblance to the constructivist notion of assimilation. To assimilate in the

constructivist sense of the word always involves transformation (of the cabbage into goat, for example). In the analogy with the digestive system, food must be transformed into nutrients in order for the body to incorporate it. This applies equally to knowledge: new information provided by the environment must be transformed into "cognitive nutrients" and it is only these latter that are integrated into the individual's cognitive network.

In this regard, it should be pointed out that, if learners could assimilate knowledge exactly as it is presented to them, without any transformation, then this would imply that they would only "learn" what they already know and that consequently they would learn nothing new from what we teach them.

Through literal assimilation, we learn nothing new
since we have not transformed anything.

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Certain theories of learning do not take assimilation into account. Behaviorism is a case in point: it attempts to account for learning in terms of behavior modification, that is, the organism's response to the stimulus provided by the external environment. For behaviorism, then, learning only involves accommodation (understood as behaviour modification). Since assimilation results from the initiative of the organism while accommodation is provoked by the external environment, behaviorism is quite consistent in its view of learning as passive.

Behaviorism neglects the role of assimilation in the learning process
and emphasizes accommodation, understood strictly in terms of
a passive modification of behaviour

From a constructivist perspective, pure assimilation involves a degree of distortion, since it cannot lead to new knowledge unless there is also accommodation, that is, a transformation of old knowledge.

Accommodation

When individuals assimilate knowledge, they appropriate it in their own terms and make it their own: in the preceding example, they say *tink* instead of *think*. In this case, there is no new knowledge. By contrast, in transforming their pronunciation from *tink* to *think*, they are thereby accommodating their pronunciation. In terms of pronunciation alone, the learning of another language involves numerous accommodations. Even the ability to communicate with speakers of the same language sometimes requires people to modify their accent: French speakers from France, for example often experience difficulty understanding a Quebecois accent. Changing one's accent is not as easy as it may appear and requires a lot of time and a multitude of accommodations.

Accommodation involves the transformation of prior knowledge
into new knowledge or the refinement of prior knowledge.

Accommodating, therefore, consists in transforming and differentiating previous knowledge: for example, “table” can be pronounced as a French word or as an English one. Such modifications operate in every situation, and their variation usually provokes relatively significant adjustments in a person’s knowledge-in-action. Knowledge is renewed every time it is activated. Thus, when new knowledge is incorporated, both assimilation and accommodation operate *in tandem*: old knowledge assimilates new knowledge and then accommodates to it.

All learning is the result of a process of equilibration between assimilation and accommodation.

The transformation of activated knowledge is sometimes so significant that it provokes a a modification in the very organization of knowledge : learning a second language, for example, implies a modification of one’s knowledge structures, since every language is organized differently. Thinking in one’s second language involves reorganizing one’s knowledge.

To accommodate is to differentiate prior knowledge and/or to reorganize it

It is the environment (i.e., the object of knowledge, whether real or abstract) that motivates accommodation. When I speak French to a Parisian who is not familiar with a Quebecois French, I have to adjust my accent if I want to be understood. The success of my accommodation is evidenced by the fact that the Parisian can now understand what I am saying. At a more abstract level, my knowledge that a > b and that b > c will lead me to understand, given time and the logical imperative that emerges through active experience, that a > c.

Certain theories of learning emphasize accommodation to the detriment of assimilation. Behaviorism, for example, views learning in terms of behaviour modification by the environment. Nevertheless, there is an essential difference between a constructivist orientation, according to which accommodation consists in an active transformation of knowledge, and behaviorism, which equates accommodation with the organism’s passive response to environmental determinism.

From a behaviorist perspective, learning is restricted to a passive “accommodation” of behaviour

Concepts are never isolated units; they are always interrelated within a conceptual structure. For example, I could not know what the colour yellow is if there weren’t other colours to compare it with. In this example, colour represents a cognitive structure (general knowledge) that allows us to distinguish and integrate a wide variety of colours (specific knowledge). Knowledge is thus organized in cognitive structures of which the larger or more general subsume and integrate the more specific. A person cannot give

meaning to any situation or object of knowledge except by assimilating it to one or more of his or her cognitive structures.

A person gives meaning to a situation by
assimilating it into his existing cognitive structures

A person's capacity to assimilate is a function of the diversity and the organization of his or her existing knowledge, which itself was constructed through earlier accommodations. Assimilation is thus the application of prior knowledge within the limitations of a person's previous accommodations.

To assimilate is to navigate familiar territory, but not unknown territory

Each new accommodation extends a person's possibilities of applying his or her knowledge. The extent of this enlargement depends on whether it involves specific knowledge or structural-conceptual knowledge. For example, learning new additions in a series (1+1=2; 1+2=3, and so on) does not significantly extend a person's capacity to assimilate. In contrast, learning a new concept, for example the concept of number, represents a considerable increase: understanding the structure of positive whole numbers enables all activities of addition and multiplication but not necessarily of subtraction and division; the whole range of possible subtractions can only be realized by extending the structure of the number concept to include negative numbers, and similarly, the range of possible divisions can only be fully realized if the structure is further expanded to include fractions.

This is but a simple example of how structural organization is responsible for the integration and effective use of a wide range of specific knowledge. Learning to add or multiply by rote memory, while certainly possible, does not necessarily lead to the construction of structural knowledge. The latter is more readily achieved in the same way as the child acquired the concept of commutativity by actively manipulating different arrangements of pebbles. It is for this reason that:

The organization of knowledge is a key notion in constructivism.

The wider the range of colours that are integrated into a person's concept of colour, the greater is his or her capacity to assimilate. One would expect that the spectrum of colours available to a painter would be more highly differentiated than that which is available to the average person; for example, an experienced painter perceives a wider range of yellows than the novice. Each new accommodation is accompanied by a more refined differentiation.

To Assimilate and Accommodate is to Adapt

Whenever a person confronts a new situation and assimilation is not accompanied by accommodation, a state of disequilibrium results. When the person manages to accommodate to the new situation, equilibrium is re-established, which corresponds to an

adaptation to the new situation. Piaget's description of the construction of the concept of commutativity by a budding mathematician (cited above) constitutes an example of the passage from disequilibrium to re-equilibrium. When the child counts the pebbles for the first time from left to right, equilibrium is maintained because nothing happens to interfere with his expectations. But on second try, this time counting from right to left, he is surprised to get the same result, he is "thrown off-balance", so to speak. From the child's perspective, counting in one direction and then in another shouldn't lead to the same result, because he hasn't yet constructed the concept of commutativity. Active experience is required in order to overcome his disequilibrium: and so he arranges the pebbles in different ways only to realize that the result is always the same. In reflecting on his experience, he comes to the conclusion that the order in which the pebbles are counted does not alter the result. Equilibrium has thus been re-established : his accommodated thinking is in harmony with the realities of his experience.

Construction of new knowledge and adaptation to the situation implies equilibrium between assimilation and accommodation.

It bears noting that, in this example, the child is not familiar with the term "commutativity", even though he clearly understands the concept in action. Everyone has at some point or another had the experience of having an idea in their head that they are unable to express in words. The idea exists nonetheless. This is why constructivism postulates that knowledge emerges from action (or from active experience) and from reflection on action in situation, and not necessarily from language, although the latter is obviously indispensable to intellectual development.

New concepts emerge from active experience (that is, from action and reflection on action) without the person necessarily knowing the words that designate them.

Congruity between Constructivism and the Competency-Based Approach

Knowledge, therefore, is constructed in action and by reflection on action in situation. Action and reflection function by assimilation and accommodation, which, in their equilbration, facilitate adaptation to new situations. The establishment of equilibrium characterizes intelligent action; in fact, from a constructivist perspective, intelligence is a function of a person's capacity to adapt to new situations. This epistemological conception is central to the competency-based approach adopted by the curriculum reform.

The following passage from the *Theoretical Framework for the Curriculum in Adult General Basic Education* (2005) highlights the congruity between constructivism and the competency-based approach :

> The primary purpose of a personal competency is therefore the person's autonomous adaptation to real-life and work situations. Autonomous adaptation

> also involves a person's capacity to develop new competencies by acting in situations and by reflecting on those actions. The development of personal competencies is therefore based on action and reflection. It requires reflective and intelligent conduct based on a person's previous experience and the use of that experience to make sense of the situation at hand. By being involved in the situation, the person mobilizes **his or her own resources**.

As the above quotation demonstrates, constructivism and the competency-based approach are entirely consistent with each other. The mobilization of a person's internal resources corresponds to the application of prior knowledge in a situation. However, within the framework of the competency-based approach, the notion of resource is larger than that of knowledge. In fact, in addition to cognitive resources, a person also mobilizes dispositional resources (attitudes, motivation, interests, self-image, etc.) and physical resources (motor resources that come into play in writing, speaking, communication, action, etc.).

Furthermore, a competency also mobilizes external resources, such as the pebbles that the child used to construct his concept of commutativity. People use a vast range of such resources in the situations that they deal with : material resources, such as paper, pencils, calculators, computers and so on; and human resources, such as teachers, friends, professionals, etc. The latter play a crucial role in a person's construction of knowledge and development of competencies, as social constructivism emphasizes.

Social Constructivism

In philosophy, the concept of an object of knowledge refers to everything that can be learned actively: knowledge of physical objects, of scientific concepts, of procedures and methods, of oneself, and so on. In short, everything that can be known is an object of knowledge. In order to construct new knowledge, a person acts on the object of knowledge (assimilation) and the object reacts, which forces the person to adjust his or her action (accommodation). New knowledge is acquired, therefore, through the interaction between the subject and the object.

The subject-object interaction is never purely individual because, on the one hand, objects of knowledge are by-and-large social (knowledge of mathematics, languages, geography, etc. is socially constructed), and on the other hand, other people intervene as well (teachers or peers in a school setting, for example). Furthermore, the knowledge that a person constructs is embedded in the sociocultural and historical context of a particular society. The following are but a few examples :

- Learning to play hockey in Russia is not the same as learning to play hockey in Canada; the sociocultural and historical context is not the same.
- People's understanding of the relation between the sun and the earth was different in the Middle Ages, because then it was believed that the sun revolved around the earth, whereas now we say that the earth revolves around the sun.

- Language is always learned in a sociocultural context.
- Learning to cooperate cannot be done in isolation.
- Learning to be an opponent requires an adversary.
- Learning to read is a social act (letters of the alphabet, names of objects, etc. are social conventions).
- Learning to pound nails into a board involves learning to use tools that have been developed and improved over centuries of social practice.
- Etc.

Social constructivism emphasizes the social nature of interactions between the subject and the object. Even those that appear to be particular to the individual (for example, inner thought) are in fact social in origin (thought depends on symbols and words, which are social conventions). This does not mean that thinking and knowing are not personal, but simply that they are socially marked. Even individualism or anarchism stem from social interactions and in reaction to the values of a particular society. But at the same time and to a certain extent, a person can be an individualist or an anarchist in his or her own way.

Social constructivism evolved from constructivism and shares essentially the same theory of knowledge, but emphasizes its social nature and the importance of social interaction. According to this perspective, adult learners construct their knowledge in social situations and contexts that affect their personal constructions. Thus, personal constructions partake in the social aspects of situations and contexts and take on their characteristics. For example, how an unemployed adult perceives his or her situation is influenced by the socio-economic context, which may be marked by a shortage of manpower and therefore a healthy job market or, on the other hand, by a surplus of manpower that results in fewer available jobs.

Social Constructivism and Pedagogical Practices

All pedagogical practices involve social interaction, whether they are conducive to learning or not. Of course, it is better to learn how to swim by practising in the water rather than by being suspended in a harness over the water, but in either case, the learning situation is a social one. In the first case, the pedagogical practice (which is social by nature) is more consistent with a social constructivist view of learning (people learn in situation, in this instance, the water); in the second case, it reflects a technical or behaviorist orientation (people learn to ‘swim’ first outside the water and only later do they apply what they have learned in the water).

Pedagogical practices conceived within a social constructivist perspective consist of active experiential learning situations that are adapted to the level of the learners and that facilitate their construction of well-structured, rich and diversified knowledge. This topic

will be considered in greater detail in a second brochure. Certain broad principles, however, are outlined below. Learning situations are most effective when:

- they provide oportunities for learners to exercise the autonomy of which they are already capable;
- they aim to raise learners' level of adaptation and autonomy in their real-life situations;
- they take into consideration learners' experience and prior knowledge;
- their complexity is appropriate to learners' capacities to learn;
- they involve learners in active experiences;
- they are pertinent to their own personal plans;
- they solicit reflection on action; and
- they provide occasions for encountering different perspectives.

The above list of social constructivist principles of learning are simply illustrative and non-exhaustive. Furthermore, it would be misguided to think that social constructivism is limited to any particular pedagogical practice, for example, project-based learning. Within a social constructivist and competency-based framework, teachers can invoke a wide range of pedagogical practices. Indeed, the curriculum reform in adult general basic education is non-restrictive in this regard: it is open to creativity, originality, diversity and pedagogical differentiation.

Nevertheless, certain pedagogical practices are not consistent with the above principles or are limited in terms of their learning potential, as for example, memorization of subject matter content and its retrieval on exams. Such practices do not promote the transformation of knowledge through assimilation and accommodation, and the memorized material does not constitute new knowledge from a social constructivist point of view : rote, mechanical learning hinders thinking, questioning and active experience.

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