

THE COMPLEXITY OF LEARNING: A FRAMEWORK FOR 21ST-CENTURY EDUCATION

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Abstract

Learning is a particularly important mechanism for the development of every subject and can be defined as a process that allows for the acquisition of new concepts and information, a behavioral modification that supports the change. Throughout history, different perspectives have attempted to describe and define such a complex mechanism: from those more focused on localized and specific aspects of learning, through Cognitivism that considered learning as a procedural, constructive and elaboration process, up to Bateson's deutero-learning that defined it as a global, relational and contextual path. The heterogeneity that characterizes the learning process and its modalities, together with the heterogeneity of the social and relational contexts in which subjects grow and develop, requires new ways of thinking and teaching that can meet the characteristics and peculiarities of every person. Contexts like family and school must respect these differential learning modalities by aiming at new forms of teaching which should not be limited to convey knowledge as mere accumulation of information. In didactics, the flipped classroom has led to consider the importance and complexity of the learning processes, in all its shades and nuances, leaving the student free to learn according to his own rhythms and ways, respecting everybody's needs and moving away from the traditional model of teaching.

Keywords: Learning, Teaching, Flipped classroom, Cognitivism, Behaviorism Deuterolearning

Introduction

Learning can be defined as a change in behavior that is rather long-lasting and firm, which is usually as a result of an experience lived by the subject; it is a process through which it is possible to acquire new concepts and information. Learning is a particularly important mechanism for every subject's development as it supports the building of a varied system of knowledge, determined by the interweaving of personal, social, cultural and emotional factors.

Its main feature is the multidimensionality attributable both to every subject's characteristics and specificities, and to the relational modalities and the context in which every person is included.

Different attempts have been made during the course of history to characterize or describe this type of process; in fact, different theories have analyzed and delved into the learning mechanisms, describing how, in effect, a single concept can take on different forms. In this case, we speak of three among the main perspectives that have

dealt with this topic, analyzing it in all its aspects: Behaviorism, Cognitivism and the Batesonian concept of deuterolearning, which characterize learning respectively as simple stimuli and responses, as information stored and elaborated or as layered processes that reach universal levels associated with their own context. These theories, together with others, allow us discovering the complexity of defining learning in a universal concept and understanding more deeply the most important developed that this process has gone through over time.

Any mechanism that is able to change behavior through an experience lived by a subject can be defined as learning. The lived experience represents the subject's ability to experiment, get in touch personally with something unusual and new, and get involved in it with his potentialities and abilities. Therefore, learning goes through the person, through the exploration of contexts and relationships that enrich every subject every day, and that accompany him throughout his life.

The first contexts, which we can define as excellence contexts where experience and learning processes arise, change and develop, are represented by the family and the school systems.

Both these contexts influence and enhance every subject's wealth of knowledge and ways of being, representing a guide to his future actions. Experiences, personal features and growth contexts influence our way of learning by developing, in all of us, an individual and characteristic style and way of being. So every subject uses unique qualities and requirements, in a personal way, in the commitment to studying, carrying out tasks or solving problems. We can therefore say that every subject has his own "style" of learning that arises, grows and connects to his own life experiences, relationships and contexts to which he belongs, highlighting certain skills, attitudes and ways of interacting. The heterogeneity that characterizes learning and its modalities, together with the heterogeneity of social and relational contexts in which subjects grows and develops, requires new forms of thinking and teaching that can meet every subject's characteristics and peculiarities. In this sense, contexts such as family and school have to respect these differential learning modes, aiming at new forms of teaching that do not merely convey knowledge but that become a source of experience, culture and experimentation to reach the goal by recognizing the complexity of this process (which is much more worth than a simple collection of information).

We speak of a new way of learning and teaching, of using a language closer to students, a new way of communicating that exploits all of its channels, a system that allows learning and that is based on one's own skills: we speak of flipped classroom. The flipped classroom allows adapting a complex process like the learning one, and legitimizing, in this way, any form of this mechanism by altering and overturning the classical didactics laws that provide for a linear relationship between teacher and learner.

Theories of Learning

There are many theories that have delved into and analyzed the learning mechanism by describing this process according to different perspectives and points of view. According to the behaviorist perspective, the best way to

explain the behavior of a subject and his ways of learning is to describe the functioning of this mechanism according to a process of relationship between stimulus and response. The main exponents of this school of thought, such as Pavlov, Skinner and Thorndike, recognized that learning processes could also involve a mental process, but at the same time, they believed that these were too elusive and ambiguous. According to this approach, learning is represented by an acquisition of habits and associations between stimulus and response, and is observed by studying and analyzing existing connections between these two elements; This process can be defined as a fragment that examines the connections between inputs and outputs. According to Behaviorism, learning occurs when there is a predictable connection between a signal in the environment (stimulus), a behavior (response) and a consequence (support). With the experience and practice, the link between these elements becomes more energetic, and the time between the stimulus and response behavior is reduced more and more. The school and training systems that relate to a behavioral vision of learning focus on conditioning the student's behavior: the teacher has the role of understanding and defining the skills and abilities that lead to an aspired behavior, and have to make sure that the students can appropriately adopt them in a progressive way.

In contrast to the cumulative and mechanical concept developed in Behaviorism, Cognitivism explains the acquisition of knowledge as a constructive and strategic process. Learning does not mean simply recording information, storing and answering them mechanically, but it rather means connecting new information to prior knowledge. Every new knowledge is the result of something constructed, and past and new acquisitions are involved in it (Cisotto, L., 2005). The innovation occurred after Constructivism and introduced by Cognitivism was welcomed in a completely positive way, both in the educational and in the didactic field. Teachers and educators saw, in this perspective, a guide to innovate teaching practices from their foundations, as well as a deep alternative to the traditional ways of teaching and learning. A new perspective that stresses the need to always connect new knowledge to the one that the child has developed previously in family and social contexts. The insistence on the development of awareness and on the training of typically cognitive processes, on the way to foresee, plan, formulate hypotheses and assess, represent the pet way of this new theoretical thinking.

According to this theory, the most significant aspects of the innovation at educational level relate to three areas:

- Goals definition,
- Didactic intervention methodologies,
- Assessment processes.

Goal definition refers to an idea of graduality in learning. Graduality stems from the continuity of the student's learning experience, who learns new concepts from what he already knows and from paths based on personalized processes and strategies he uses to acquire new knowledge. In the Cognitivist view, the objectives of learning and teaching process have a certain degree of complexity, primarily because they refer to thought processes and not

to individual behaviors, secondly because learning processes always involve a personal processing of knowledge and a constructive effort.

Didactic intervention methodologies, instead, refer to the constructive character of learning, an educational methodology setting based on the student's participation in the realization of his own knowledge. Education, at any school level, has the task of building and supporting students in a mature learning style, through the use of constructive strategies that stimulate knowledge processing and the construction of a meaningful conceptual network for every subject.

Finally, the assessment processes emphasize the importance of the planning-assessment combination, ignoring the students' individual performance. The assessment becomes continuity as, step-by-step during the learning process, feedback from the ongoing activities is provided; it has a diagnostic character as, in the initial stages of a path or a learning activity, the presence of the skills required to perform a given task is assessed. In this sense, the Cognitivist approach gives emphasis on procedural aspects of learning, focusing more on every subject's dynamics and development processes. So the assessment of skills and abilities can be certainly more authentic if made in a processual perspective, since verifying a level of competence achieved without any connection to one's own learning path, the way a result was achieved, does not allow observing the development potentialities or, as Vygotskij affirmed, one's own "zone of proximal development".

A model that is close to the concept of a learning process that connects, that creates a relational network within the process and among members who participate actively in it, is represented by Gregory Bateson and his theories of learning.

This is a viewpoint which considers the subjects as an active, productive and dynamic part of the learning process, in a system (like that of school) where it is essential to consider all the active and responsible parts in building an environment full of opportunities. This model is very far from a concept of learning as linear mechanism, as an act of filling an empty space that shifts from one point to the other by conveying pre-established and pre-embodied knowledge, ideas and concepts.

Bateson defines learning as Deutero-learning, that is, the ability of a person to learn how to learn, to acquire how to acquire. In describing this process he analyzes different ways of learning which start from a zero level and reach a "level three"; the different steps through this layering lead to a significant change in the subject and in the way he interprets and reads different situations and contexts. In particular, we can say that with "level zero" learning we refer to a modality characterized by the specificity of the response that is not susceptible to any correction. "Level one" learning, instead, allows for a change in the specificity of the response due to the correction of mistakes, but the answer remains limited only in that particular context that must be reproduced in the same way. "Level two" learning process designates the change in the set of behaviors adopted to make a choice, making a significant change in primary learning, or better, in those behaviors that respond easily to a

stimulus allowing for an overview and greater flexibility (deutero-learning). Finally, “level three” learning is a change process which represents a deep and complex restructuring of the learning contexts like, for example, in the psychotherapy processes.

Deutero-learning is a “level two” process, much more complex than a simple acquisition, and concerns the ability to learn how to learn; it allows switching from individual experience to a real structure of meaning, an ability to delve into and connect one's own knowledge and withdraw from them. The concept of learning worked out by Bateson does not make reference to a simple storage of concepts and ideas, but employs these notions by connecting them with each other within a system/context. This allows every subject learning from what he has learned, unifying what he has acquired in a unique and universal meaning.

The concept of learning, as we have seen, is characterized by a large structure where different elements contribute to creating a solid, functional and efficient shape. A new way of understanding this process allows considering the close web of elements that constitute it, supporting the construction of new and efficient didactic intervention methods and tools, endorsing knowledge based on collaborative and emotional aspects aiming at supporting every subject's abilities.

New perspectives of Didactics

In the United States, for several years, the major universities have favored the use of real alternative online courses; this alternative didactic modality has led to a real change in the school and didactic panorama by contributing to bringing greater functionality in the learning modalities and processes. This methodology was subsequently transferred in the context of primary and secondary schools, thus contributing to a new idea of didactics: we speak of flipped classroom or flipped teaching, a great innovation in the educational field that has led to consider the importance and complexity of the learning processes, in all its shades and nuances. The flipped classroom makes the student free to learn at his own rhythm and in his own ways, providing him with the learning materials selected by the teacher by respecting his needs and moving away from the traditional model of teaching. Therefore, this flipped modality consists in changing the place where the lesson is run (one's own home replaces the class) with the one in which the subject studies and does his homework (in the classroom rather than at home). For some years, students at the Woodland Park High School in Colorado, and many other schools in the world, attend classes at home via videos made by their professors; then they study and make exercises in the classroom in small groups while supported by their teachers, who can take into account their rhythms, progresses and potentialities by working out ad hoc interventions for every subject.

This methodology reflects the needs of a new school, where learning processes are considered more important than the final outcomes achieved. In addition, several elements that were inevitably not taken into due consideration in traditional school, here are supported and highlighted. The friendship network within the classroom is strengthened by a collaboration implicitly referred to by this methodology, and the relationship

between teacher and student is no longer represented by an idea of rigid complementarity: the teacher conveys knowledge to the learner that, in turn, assimilates passively all the notions, ideas and concepts.

The relationships, in this case, turn positively into equal and comparative, they gain the real educational value that any teaching methodology should have and preserve with care, consideration and attention. Thus the school environments turn into stimulating and supportive places, where the teacher-student combination melts from its linear rigidity, opening up to mutual support and safe foundation opportunities, representing a starting point, a free exploration point from any constraint open up to different forms and ways of learning. The flipped classroom, through its methodology, responds to didactic requests that gradually become increasingly demanding and complex; The current society has profoundly changed from the contexts in which the traditional teaching model had initially developed, and so the opportunity to review and reconsider its structure and foundations must be considered. Specifically, we can say that the spread of the Internet has radically changed the distribution and acquisition of knowledge; It is no longer the teacher's unique characteristic and prerequisite to be the source of information and knowledge.

Online learning is based on the assumption that widespread knowledge can enter into a synchronous relationships, creating new knowledge and mutual enrichment. The network, however, is not only an immeasurable information repertoire, but it is also a stage for showing different viewpoints on knowledge, each with the possibility to influence and change the other. "Being on the network means being part of a dynamic setting, that is, a structure of bonds connected to conversations, stories, and narrations" (Lévy, P., 1996). In this sense, the network assumes the role of that kind of knowledge that is the central component of the shared knowledge building process and its new ways of learning it. The reversal we find in the flipped classroom responds to these new social needs, and to the need to find an educator in the teacher, a person who can act as facilitator and guide in the difficult development path of every student. The teacher as a guide and educator plays an extremely important role as he can represent a stimulus for participation, growth and development by walking side-by-side with the student in building and enriching not only knowledge, but also his own personality and values. The type of relationship that we will be established between the child and the teacher is crucial as it will also affect school performance. Believing in a student's abilities can facilitate his effective school success and his ability to perceive himself as competent and skilled, allows for the creation of a strong and voluntary personality that will help the student re-interpret his abilities and skills according to new perspectives. Perceiving a competence generates in the child the desire to participate, to be active in the class group, thus supporting sharing and fellowship.

In the flipped classroom, every teacher knows the level of his students and develops the teaching path by adapting the contents to classroom needs, and by modulating the basic interventions to the goals to be achieved, preparing and making video lessons that will be published and made available to the students. A further reversal of the flipped classroom model involves making homework in the classroom, so that students will go to school already

prepared for the subject on which the lesson will be held and the teacher will be free to implement optimal teaching strategies for the specific theme to be addressed and consolidated. The teacher will then become the facilitator/educator working alongside his students in the process of contents processing, simplifying and supporting their ability to cope with the difficulties in this delicate assimilation phase. The teacher's task becomes that of codriver in the learning process with the student, and the student becomes an active part of that process at every stage. The role of the teacher is in fact decentralized in favor of the learner, without however devaluing the importance of the teacher and attaching him a much more significant role in the whole educational path. One of the most interesting aspects of this methodology lies in the assessment process; at this stage, in fact, what is under observation is every subject's learning path with respect to his peculiarities, abilities and characteristics. The traditional school and assessment model, based on the assessment of the single performance, leaves room for a vision that connects the different aspects of learning by emphasizing potentialities and skills.

Therefore, the fundamental goal of future education and of a contemporary idea of school should aim at the global education of the individual and not to a simple knowledge "communication", characterized by the fragmentation of knowledge that mortifies a new and natural attitude of the minds. Knowledge learning methods and processes cannot be understood as a "pre-packaged" tool, thus without considering its complexity and diversity. It is necessary to address new ways of conceiving school, to provide an alternative orientation to meet new and unexplored social needs, opening up educational contexts to different fields of investigation, towards alternative and innovative perspectives.

Conclusion

The exploration of different didactic and educational methodologies and theories allows considering and reconsidering the importance of the processes and objectives of the didactic intervention. The centrality of the learning processes stems from its complexity that highlights needs and requirements, by aiming at the development of accurate and functional methods. Starting from the theoretical perspectives taken into consideration, encouraging alternative perspectives for didactics arise, which support paths where knowledge building and the processes that characterize it become the focal point of interest and investigation, and contrasting with the standardization of abilities and potentialities of every subject.

Didactics, as a science that deals with the set of tools and forms of mediation making knowledge available to students, must aim at a new image of school and different dimensions of learning that intersect in family, school and social contexts. A more complete and detailed form of the learning process in which not only the concepts and knowledge learned from the student are important, but also the set of attitudes and behaviors with which he is able to support, direct and improve his own learning activity. An overview that students should acquire and assimilate in order to make knowledge-sharing relationships possible, rejecting sterile and artificial forms of education.

According to Morin, the current distinction generated by the separation of the various disciplines is limited and limiting not only for the knowledge of oneself, but also for the vision of the human being's needs, which, instead, should be represented by a complex physical, historical and social factors unity. It is desirable for any discipline, combined with global knowledge, to support students in becoming aware of the importance of the reflective thought, which allows them taking a critical and complex viewpoint that can aim at achieving knowledge of knowledge (Morin, E., 1999). In this perspective, many stimuli arise to reshape, to give new life to education, and to broaden the fields of interest and investigation of didactics.

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