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Reflections on pedagogical paradigms in design

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ABSTRACT
Education is a consubstantial process of human nature. Since the most remote Paleolithic there has been intentionality, in the course of many generations, efforts have been made to assimilate culture to the environment, developing new skills and domains. The diffuse and incidental education that occurred in the family environment, in communities or small societies, was transformed into a specialized function of society, which gradually shaped the school institution. The school, which at first was a place specialized in the learning of literate culture, sacred culture and elites, gradually gave way in the twentieth century to a place of generalized and compulsory attendance in those populations with advanced technology. Thus, school is an essential condition for any citizen to survive and adapt to the environment.
In this passage to formal education, multiple disciplines were historically inserted, among which design stands out for its "schooled youth". The place that design currently holds in education has meant a process of progressive generalization of its teaching modalities and the way to achieve it. In many of the reflections that have been carried out to support the schooling of design, there are important psychological, pedagogical and philosophical considerations.
It is relevant to understand, on the one hand, the pedagogical references, shared by educational psychology to interpret the philosophical ones, since the former provide the elements to observe the student, the learning process and the learning situation, and the latter are the support that argues and validates each of these domains.

Keywords: Design, Teaching, Paradigm, Pedagogy, Epistemology.

1 INTRODUCTION

Education is an intrinsic process of human nature. Since the most remote Paleolithic there has been intentionality, during many generations there has been an attempt to assimilate culture to the environment, developing new skills and domains. The diffuse and incidental education that took place in the family environment, in communities or small societies, was transformed into a specialized function of society, which gradually shaped the school institution. The school, which at first was a place specialized in the learning of literate culture, sacred culture and the elites, was given way specifically in the twentieth century, to a place of generalized and compulsory attendance, in those populations that have advanced technology. In this way, school is an essential condition for any citizen to survive and adapt to the environment.

In this transition to formal education, multiple disciplines were historically inserted, among which design, due to its "schooled youth", stands out. The place that design currently holds in education has led to a process of progressive generalization of its teaching modalities and the way in which it is

achieved. In many of the reflections that have been carried out to support their design schooling, there are important psychological, pedagogical and philosophical considerations.

It is relevant to understand, on the one hand, the pedagogical referents, shared by educational psychology to interpret the philosophical ones, by virtue of the fact that the former provide the elements to observe the student, the learning process and the learning situation, and the latter are the support that argues and validates each of these domains.

The optimal teaching of design, as of other disciplines, requires the mastery of three areas: knowledge and conceptual, teaching and decision-making skills. That is why we have been questioning for decades the most efficient methods for the teaching-learning process of design, and the ways in which you learn what you learn. The visions of the student, the teacher and the methodology have been broad and with contrasting positions and the theories of design teaching do not end, and will not, there is no great or permanent theory, they are in the opportunity to be restructured or enriched to strengthen this educational field, however, one of the fundamental characteristics of design pedagogy is its multiparadigmatic nature with different philosophical visions.

A paradigm is a categorical way of perceiving reality from a given community of knowledge, it has a defined structure composed of theoretical assumptions, epistemological foundations, methodological criteria and ways of applying it to reality, in order to transform it. In the case of the pedagogical paradigms of design, each one proposes a different way of conceiving the task of design and the educational discourse in all its processes and dimensions.

1.1 THE TEACHING OF DESIGN UNDER BEHAVIOURIST TERMS

Within the current paradigms of the discipline, the one that has been maintained for the longest time and therefore with the greatest tradition within design, is the so-called behaviorist. It is one of the projects that has generated the most projections of application in the teaching of design. For this reason, one of the dimensions of the discipline that has been most developed by the presence of the paradigm is the technical-practical one.

This paradigm is based above all on the conception of the extrapolation-translation hypothesis arising from the so-called behavioral analysis applied to education, based on the principles of basic behaviorist research, obtained in artificial scenarios. These principles are extracted and transposed to the different educational situations of design.

Behaviorism is part of the philosophical tradition of empiricism. According to this view, knowledge is a copy of reality and is merely accumulated by associative mechanisms. The knowing subject, in this case, the designer, is a passive entity, a "tabula rasa", a "blank book", where the deterministic contributions of what is designed are printed. According to the empiricists, the origin of knowledge lies in sensations (raw material for design impressions), ideas (direct copies of sensations

or reflections of reality) and the associations between the two (which result in what is designed), thus ruling out the possibility that any rationalist stronghold has a dynamic participation in the determination of the designer's behaviors.

Three of the characteristics of empiricism have been inherited for the teaching of design: environmentalism, associationism and anti-constructivism. Design teaching is environmentalist in that it considers that it is the environment (physical and social) that determines the ways in which designers behave. Learning is at the expense of context, and in that sense, at a certain time, external conditions can be arranged for the design student to modify his or her behaviors in a specific way. Consequently, the extreme environmentalist conception presupposes, at the same time, the notion of a knowing subject or passive learner, a recipient of external influences.

Associationist design starts from the point that we relate things and experiences in memory, in thought and in mental life, simply because from our original experience they are linked, and because our first encounters with things occur through the senses, the associationist teaching of design is based on the idea that all the complexity of what is designed can be reduced to impressions That is, to the elementary components of consciousness and their relations to experience.

In the teaching of design under anticonstructivism, the subject generates what is designed through the accumulation of relationships or associations between stimuli and responses.

This paradigm is primarily anti-theoretical, consistent with the empiricist epistemology that underlies it. However, it is recognized that it is based on the model of responses to incentives as a fundamental scheme for the descriptions and explanations of the behavior of designers, and all their attitudes, no matter how complex, can be analyzed in their most elementary parts and easily associated with any other kind of initiatives, that is, the so-called equipotentiality.

According to the scheme of this paradigm, in the teaching of design, the behaviors that are of most interest are the so-called operant or instrumental ones, which are not automatically evoked by the antecedent stimuli but can occur deliberately. Here the principles of parametric design are inserted, whose support, in addition to the geometric principles, is the formula benefits = + income – costs with the idea that parametric thinking introduces the change of mentality between the search for a static and concrete formal end, and the conscientious design of the factors and the stages we use to reach it. It is the use of algorithms not to draw shapes, but to create formal possibilities or families of possible solutions, using software not as a resource of representation, but as a means of design. (De Lapuerta, J.M. & Mosayebi, 2023)

There is also the design based on project management in which the PMI scheme (PMBOK, 2021) is implemented, which involves the automation of the workflow and the driving of the life cycle of the designed object.

1.2 HUMANISM AS AN ALTERNATIVE FOR TEACHING DESIGN

The second paradigm is the humanistic one, a complex mosaic of factions directed by the socio-affective domain and interpersonal relationships with applications regulated by extrapolation-translation, whose plans and theoretical schemes have been practiced in the field of design teaching, making only immediate adjustments according to this context of application. The pedagogical research carried out from the perspective of this approach in general is oriented to the refinement and validation of design practices, but scarcely to the generation of innovative knowledge.

However, the paradigm is of enormous historical importance, as it has pointed out the shortcomings of educational practices and the fields of application of other approaches that have been forced to critically reconsider some of their positions, in order to broaden their horizons of application.

The current is part of philosophical orientations that have been concerned with understanding the nature of human existence, such as existentialism and phenomenology. From these approaches, some authors of the paradigm have taken up some of their conceptions and assimilated them to the movement.

Existentialism has incorporated the idea that the designer creates his person by the choices or decisions he makes, "I am my choices" as Sartre himself would say (1937, p. 563). Design is understood as an action in freedom, regardless of the conditions in which it is generated. According to Morris (1966) to put it briefly, the pillars of the existentialist position can be summarized as: I am an elective person, unable to avoid choosing my destiny; I am an absolutely free individual to set my life goals; I am the agent responsible for my own choices.

Phenomenology focuses on the study of external or internal perception that is based on the encounter with phenomena or the essence of things, without any kind of *a priori concepts*, it is to "go to the things themselves", aspiring to describe them as they are.

Designers are driven by their own subjective perceptions and in essence, phenomenologically, design responds not to an objective environment, but to the environment as it is perceived and understood. In this sense, also from the phenomenological perspective, in order to study the design process, it is necessary to understand the problem from the point of view of the teacher (as he perceives it) and not from another extreme (that of the designer who intends to study it).

From the conceptions of these two great philosophical systems and from the theorizations and analyses of humanistic psychologists, a comprehensive theoretical framework is developed in which fundamental postulates are distinguished:

The holistic emphasis of the humanist designer clearly distinguishes it from other atomistic and reductionist positions. To explain and understand design, we must study it in its entirety and not fragment it into a series of reflective processes.

A designer must naturally be interested in his self-realization as a self-formative tendency that will lead him to self-determination, self-realization and transcendence, because he lives in constant relationship with others and this is an inherent characteristic of his nature.

The designer must be aware of himself and his existence and be empowered to elucidate, with freedom and conscience to make his own choices and decisions, since it is his task to act as an active professional and builder of his own life.

Every designer is committed to intentionality. Volitional acts are reflected in their own designs; Through needs and purposes, he structures a personal identity that distinguishes him from others.

In the humanist paradigm are the pedagogical theories of integrated generalizing design, which consists of merging concepts, variables or divergent elements to generate an incorporated and complete totality (Rivas & others, 2009, pp. 180-190); it is a conscious effort to establish meaningful order (Papanek, 2014) and user-centered design, in which ergonomic utility and functionality take precedence over the form of what is designed, eliminating poetic or aesthetic excesses (Norman, 2004, p. 75).

1.3 COGNITIVISM, AN ALTERNATIVE TO THE BEHAVIORIST VIEW

While the behaviorist paradigm, reviewed above, is the oldest and most traditional in design education, the third cognitive paradigm of human information processing is one of the strongest and has undoubtedly displaced the first in recent decades.

The cognitive pedagogical paradigm is regulated by the hypothesis of interdependence-interaction, which produces a knowledge of self-management and generates a growing number of lines of research within the educational field of design. From this approach emanates the so-called instructional design, which involves systematized planning which contains needs assessment, development, evaluation, implementation and maintenance of plans and programs (Belloch, 2013).

Likewise, models such as those of Rasmussen (2008) and Endsley (1995) emerge based on the domain of complex design systems and programs that are organized based on decision-making stages: activation, observation, interpretation, evaluation, selection of objectives and execution. So-called "situational awareness" is an equally important feature in complex, dynamic and risky fields where subtle cues, changing situations and elements of special knowledge must be perceived.

The information processing approach came to light in the 1960s, when seminal work and research emerged in the field of cognition. We can say that these efforts came from three fields, which are considered immediate antecedents of this paradigm, namely: linguistics, information theory and cybernetics, in particular, the field of digital technology.

Some have called this movement the "cognitive revolution", and it is possible to say that it constituted a real paradigm shift in the Kuhnian sense. In addition to the factors indicated, it is

necessary to recognize two other historical and exogenous situations that created an atmosphere conducive to the development of this paradigm within design pedagogy: the importance of the technological revolution in the field of communications and informatics, and the climate of criticism and distrust towards the behaviorist paradigm with the direct challenge of its underlying epistemological and methodological conceptions. based on positivism.

A considerable amount of research and theoretical information has been developed on the different facets of cognition in design, understood as the acquisition, organization and use of knowledge (Neisser, 1982), inspired by the metaphor of the computer, according to which the computer is an instance of information processing systems, to which the design process belongs. Therefore, this paradigm is not a monolithic approach, since there are currently several currents and traditions from its approach.

The applications and implications of this paradigm in the field of education have also been multiple and rich, based on the approach of the so-called instructional psychology (Glaser, 1982). It has been conceived as a bridge between cognitive psychology and the field of education, therefore, it is a proposal regulated by interdependence and interaction. Currently, it is one of the approaches with the greatest heuristic and prescriptive potential within educational psychology and design pedagogy.

This paradigm is part of the great rationalist tradition in philosophy, giving primacy to internal representations and entities (ideas, concepts, plans, in short, any type of cognition) over external facts during the process of knowledge.

1.4 THE CONSTRUCTIVIST VISION AS A HORIZON FOR TEACHING DESIGN

The designer's behavior is not regulated by the external environment, rather, it is regulated by the representations he elaborates or constructs. The designer is an active subject, whose actions depend largely on the mental models he develops as a result of his relationships with the physical and social environment; It thus ceases to be a tabula rasa, accumulating sensory impressions by association, structuring its ideas about reality. Here the designer systematizes his perceptions, rationally delves into them within his general cognitive system, and elaborates subsequent interpretations to solve the problems.

Recently, within the paradigm of information processing, a large number of theorists have declared a constructivist stance in their approaches to how the subject knows external and internal phenomena. According to this conception, the designer would possess an internal organization of circumstances and experiences that he reworks according to the exchanges with the outside, and from this internal organization of structures, schemes, rules, etc., he continuously interprets and resignifies, in a dynamic way, reality, through what is designed.

This is the constructivist paradigm, one of the ones that has generated the greatest amount of expectations in the field of education and, at the same time, one of the ones that has caused the greatest impact in the field of design.

Constructivism can be categorized, as in the case of the cognitive paradigm, inserted in the perspective of interdependence, and its most recent arguments are located in the Geneva school that ranges from the studies of Saussure and Piaget to Bovet and Flournoy, with an interactionist stance.

Unlike empiricists, constructivists give the designer an active role in the process of knowledge. They assume that the information provided by the medium is important but not sufficient for the subject to know. On the contrary, and in agreement with the rationalists, they consider that the information provided by the senses is strongly conditioned by the conceptual frameworks that in fact guide the entire process of acquiring knowledge.

These are neither the product of sensory experience (as empiricists might claim), nor are they innate or a *priori* (as some rationalists establish), but are constructed by the designer when he interacts with physical and social objects, which presupposes a kind of critical realism, a methodological position that highlights the fact that "social structure depends on human activity" (Haussman, 1999). 1998, pp. 185-213) with genuine causal relationships.

A fundamental category for the explanation of the construction of knowledge are the physical and mental actions that the designer performs in front of the designed object. At the same time, the object also "acts" on the designer or "responds" to his actions, promoting changes within his representations. Therefore, there is a reciprocal interaction between the subject and the object of knowledge.

The designer transforms the object by acting on it and at the same time constructs and transforms its structures or conceptual frameworks in an endless coming and going. The subject knows the object more and more, the closer he gets to it, by means of the resources and knowledge he possesses, he creates an ever more complete representation of the object. In the teaching of design, pedagogical theories such as integral design are based on this paradigm, which has the human being and space as axes and considers the discipline as an activity at the service of the community for which it is responsible; or the vision of strategic management, according to which the designer leaves the operational, linear and repetitive executions to train as a director of project processes, is a more executive vision that involves collaborative design.

1.5 SOCIOCULTURAL VISION IN DESIGN EDUCATION

The **sociocultural paradigm** is, in comparison with those previously reviewed, the one with the least tradition in the field of education. However, the projections of the paradigm to the formative context of design are in full development, so it is possible to make some brief points about it.

First, the paradigm has established close ties with the cognitive paradigm, as a result of the pedagogical movement of the 1960s that rediscovered Vygotsky. The links with the cognitive paradigm and the nature of the paradigm itself, as a study of cognitive processes and school and cultural influences, make its intervention in the psychoeducational field of design promising. The strongest philosophical influences come from dialectical materialism and its categories: essence and phenomenon, cause and effect, necessity and causality, the historical and the logical, content and form, possibility and reality, singularity and universality, and the abstract and concrete.

The problem of knowledge between the designer and the designed is solved with the dialectical interactionist approach, in which there is a relationship of reciprocal influence; Yaroshesvky (1979) calls this two-way interaction objectual activity, since it transforms the object (reality) and the very bearer of the activity: the designer.

In the objectual activity, what is designed is materialized by developing historical-social practices, given the processes of production. In this sense, there is a dialectical transformation with respect to the theories that understand the activity of design as a pure individual adaptation, towards a conception where the designed is conceived as a social practice subject to the historical-cultural conditions and influences that include tools and signs

The sociocultural paradigm is schematized in very general lines, and in the opinion of some it is still unfinished, however, it has had a great influence on the teaching of design, generating schemes such as sustainable design (Vilchis, 2012), an alternative thinking structure that leaves the complacency of the client for a logical and ethical order; *design thinking* (Plattner, 2014) which focuses on human values, radical collaboration, awareness of the process and validation of ideas, and the necessary link between thought and action; or transitional design, which strives to move from teaching schemes based on the theory of how something is designed to arrive at the theory of design itself and start from the conceptual abstractions that really argue praxis (Ramírez, 1997).

In these options, the designer always knows in terms of his assimilative frameworks, and in this sense he is said to have a reference of what he can know at a relative moment in his development. In the same way, it follows from these premises that there is never a level of discernment where one can no longer know more than what is designed, but can always understand it even more. Any level of consciousness at any given time is simply a state of ephemeral equilibrium, open to higher stages of reason and intuition.

2 CONCLUSIONS

One of the conclusions of this reflection is that, despite the fact that we have located contemporary theories of design education, they are not based on current philosophy, rather they refer

to reflections that place their beginnings in the first half of the twentieth century, which forces a reconsideration of this peculiar phenomenon.

There are great philosophical and pedagogical absences in the teaching of design, I will only mention four of the most influential in the last decade: Bruno Latour's actor-network theory according to which facts and values, science and politics, nature and culture must interact in the intervention and transformation of all reality; Peter Sloterdijk's theory of spheres, which calls for a common constitution for man, machine and nature in a clearer understanding of the basic structures of what human existence consists of; Pierre Bourdieu's theory of free culture, according to which every university student should have access to all things and knowledge without social disadvantage (Bordieu, 2005, pp. 23-41), and Zygmunt Bauman's theory of the liquid world (2017), who, based on the idea that today is characterized by volatility, states that the essence of the idea of education, As it has been conceived throughout modernity, with pre-established schemes, it has collapsed. The nature of today's society is out of date with the old principles of learning, conceived in an enduring world in which memory was a positive asset.

In a deregulated and unpredictable world, the goals of orthodox education are fraught with difficulties. Time-honored habits, ingrained customs, strong cognitive frameworks, or praise of stable values become impediments. The knowledge market no longer calls for long-term loyalty, long-lasting bonds, or unbreakable commitments. In the open and deregulated market, anything can happen, and success can be a by-product that has nothing to do with the educational effort and that may not be repeated. Great stars of the media firmament such as Steve Jobs, Jack Dorsey, the inventor of Twitter, or Damien Hirst, idol of BritArt, have gone through the experience of dropping out of school. In the information society, knowledge is presented in the form of a cascade of data and information that is too often fragmentary and disjointed. When the amount of information tends to increase and is distributed at an ever-increasing rate, the creation of narrative sequences becomes, as Bauman states, increasingly difficult. The "modern liquid culture" is no longer a culture of learning, it is, above all, a "culture of detachment, discontinuity and forgetting."

All of the above leads to the deduction that the omission of philosophy in the schemes of design, both in the pedagogical supports and in the educational contents, has formed a considerable pedagogical and epistemological hollow that we are obliged to review.

Faced with the multiple challenges imposed by Higher Education in our respective countries, it is worth asking what is the role that the teaching of Design and the University itself should assume in the face of the reality of society in its most varied challenges: economy, education, health, poverty, natural resources, production, technology, science and research, together with the challenges of the training of future leaders. To elucidate the projection in the short, medium and long term of the main challenges to be overcome and everything that the role and objectives of professional education entails.

Both aspects, the role of higher education and the sense of discipline, are subjects inherent to the long-awaited development process in our nations. We must be important actors in these processes and for this it is necessary to be in the debate and take responsibility from our spaces to build a better society and grant a higher quality of life to society itself. Design Schools should guide their students in relation to these topics from Sociology, Anthropology, Ethnography and Culture in general. How we are doing them should be a matter of reflection and exchange that enriches our meetings and contributions.

We must not forget that design and design constitute a heritage for future generations. Design is a faithful expression of one's own identity and an extraordinary contribution to social, economic and cultural life, which is why we must consider ourselves, teachers and students, as integrators of a disciplinary thought that animates design globally.

If we are truly aware of the importance of the discipline as a heritage and a wealth of values, we must make it grow and look for the formula to continue rescuing its antecedents and adding them as a memory to teaching. All heritage must be researched and as such understood, deciphered or simply known for its real interpretation and use by current and future generations. It is in this task that we will look to the future, as a mirror that will allow us to see ourselves and allow ourselves to change in a permanent action in favor of society.

We know that there are more than 600,000 students who study Design in Latin America, they deserve a better future, these students are the bearers of our own efforts and those who preceded us. Let's not waste the opportunities to contribute with experience and knowledge to the new pedagogical considerations of design in all its branches and specialties, let's generate knowledge, let's think about transdisciplinarity, collaborative work, student mobility, the exchange of ideas, project-based design and all the seeds that we have in different coordinates of our continent, that would contribute to the reconsideration of the teaching of such a noble, relevant and significant discipline in the contemporary world: design.

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