Being a Teacher in an Era of Uncertainty and Perplexity

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The ambitious challenges of the contemporary digital age require the development in each citizen of cognitive and affective capacities of a higher order, which allow expert thinking and effective communication, decision making in situations of uncertainty, problem-solving, and innovative proposals in economic, cultural, and political contexts, increasingly confusing, fleeting and complex. The text discusses the nature and meaning of a new school, a new pedagogical culture, and a new professional teacher to face the magnitude of these challenges: provoke, guide, and stimulate the passage of each learner from information to knowledge and knowledge to wisdom. More specifically, the formation of the "practical thinking" of contemporary teachers is analyzed and discussed as one of the key axes of their satisfactory professional development. What does this "practical thinking" mean in the initial and ongoing teacher training? Is it possible to develop "practical thinking" in the current Spanish institutions of teacher training?

Keywords: teacher role, teacher education, reflection, practical thinking, professional development, reinventing the teaching profession

EDUCATIONAL CHALLENGES IN THE AGE OF INFORMATION AND PERPLEXITY

The complexity of contemporary life in the digital age requires a human subject cognitively and emotionally capable of living with a certain sense and relative autonomy in this liquid society of permanent change, structural complexity, abundance, uncertainty, and inequality (Morin, 2011; Bauman, 2013; Bauman and Leoncini, 2018). Human beings are forced to construct meaning and elaborate meaning in the increasingly complex, uncertain, fleeting, and confusing scenarios and encounters in which we become involved as actors. For this reason, the ambitious challenges of the contemporary digital era require the development of each citizen of higher-order cognitive and affective capacities, which allow expert thinking and complex communication, decision-making in situations of uncertainty, approach and solution problems, and creation of alternative scenarios. That is an informed, independent, and creative thinking. Leaving the tasks that consist mainly of cognitive routines and operational routines of a reproductive and algorithmic nature, in the hands of the increasingly sophisticated and powerful machines, which execute these tasks in an unlimited way, rigorous and efficient.

Is education up to these political, social, and cultural challenges? The conventional, one-size-fits-all school, inherited from the era of industrialization and continues to this day, does not provoke, in my opinion, the "educational" development of the contemporary subject. Meaningless memorization prevails, discourages, bores, and discriminates against those who do not fit the one size fits all. It decontextualizes, encourages superficial learning, isolates teachers, inflexibly organizes students by age in rigid schedules

and spaces. It requires learning by heart a curriculum organized in disciplines, kilometers long by millimeters deep. Confuses means-ends, has a very restricted idea of knowledge and intelligence. Ignores the practical and creative dimension of knowledge. Forgets or it despises fundamental dimensions of the personality such as attitudes, habits, emotions, and values drown. Obsessed with the qualification and forgets the educational evaluation (Gerver, 2012; Willinghan, 2009; Ravitch, 2014; Pérez Gómez, 2012, Claxton, 2008).

It is true that, in the last half-century, we have advanced significantly in the development of a powerful and grounded pedagogical discourse. However, the practices follow the inertia of the inherited school: schooling has spread and universalized, but the conventional school has created this simple and one-way pedagogical culture that is very well rooted, resistant to change, which is very difficult to rebuild and transform.

Therefore, the current challenges of this already obsolete school device appeal, in my opinion, to the strengthening of truly educational processes, not only to the processes of socialization and instruction (Pérez Gómez, 2010). In other words, it requires the development, in each citizen, of higher-order cognitive and affective resources. The pedagogical challenge is to design and organize space, time, social relations, activities, curriculum, and evaluation to help form the educated, supportive and autonomous citizen that the complexity of this contemporary global and digital scenario demands. In other words, this process requires higher-order cognitive and socio-emotional resources and capacities, which, in my opinion, implies the transition from information to knowledge and from knowledge to wisdom in each one of the learners. (Pérez Gómez, 2017; Maxwell, 2013, Sternberg, 2015). For Ackoff (1999), data are symbols that represent properties of objects, people, and events. The information consists of the data processed to increase its usefulness and responds to the following descriptive questions: Who? What? How many? Where? When? For its part, knowledge refers to the organized set of information that seeks to communicate and explain phenomena, problems, and situations of reality and responds to more complex, functional, and explanatory questions: How? Why? Wisdom already corresponds to another level and can be considered as the use of the best cognitive and socio-emotional resources available to the subject. For the governance of their own life as a person, citizen, and professional. It implies unavoidable options of value and responds fundamentally to ethical and teleological questions. Why? Where to? What is worthwhile?

As I have developed in detail in my last book entitled "Pedagogies for times of perplexity" (Pérez Gómez, 2017), human knowledge cannot be considered as an object that is owned, acquired, bought and sold, stored and reproduced. Knowledge is a complex subjective combination of meanings, supported by information-data-facts, that says something about reality, natural, social, or personal. Meanings that shape schemas, models, maps, and mental scripts to guide our understanding and action. From a very wide epistemic interval that goes from information to paradigms, what should we dedicate ourselves to in school? To the lower level of knowledge: reproduction of data, facts, dates, algorithms, etc. Possibly, it was an understandable pedagogical strategy until the 20th century. Because without data, there is no knowledge and the data at that time, was in the mind of the individual or it was nowhere, except for those privileged people who could have access to select libraries. However, in the 21st century, what is the point of storing data, more or less ephemeral, that we do not use? We are incapable of storing the amount of data that grows exponentially and accelerated in all fields of knowledge and in addition, we have ubiquitous, immediate, and easy access to this updated data, at the click of a mouse, from a mobile phone. Just what we use frequently, such as language, is worth memorizing. Therefore, let us dedicate ourselves to working with children with diagrams, models, and mind maps and to teaching them where to look for the required data, how to search for it, evaluate it and select it.

However, neuroscience (Grazzaniga, 2013, Damasio, 2010) confirms that around 90% of these mental schemes and processes, built throughout life, that are set in motion when we perceive, interpret, make decisions, and act, remains below consciousness. The natural way of functioning of the brain is to automate the associations and understanding and action schemes that we are consolidating. Acting automatically is the brain's preferred style to save energy, minimize danger, being effective and maximizing rewards. We incorporate and convert into habits and routines both cognitive, affective, and behavioral components: knowledge, skills, emotions, attitudes, and values. For example, we subconsciously learn how to act when

we are happy or angry, when we feel pleasure, and when we are faced with frustration. All aspects of our personality are immersed in these automatic mechanisms of understanding and action.

What do we do in school, working exclusively with that 10% of consciousness, of declarative, explicit, theoretical knowledge, as if it had a life of its own, independent and isolated, abandoning 90% of the mechanisms that decide how we perceive and interpret, who? Are we acting? How are we acting? Or, how do we act? Our implicit backpack, our automatic pilot, and our adaptive unconscious are responsible for a large part of the perceptions and decisions that condition our daily actions. Brain automatisms are essential to act efficiently and economically in everyday life, but also, by remaining below consciousness, they are difficult to detect and change when necessary. Therefore, the truly educational pedagogical task requires designing processes and activities that allow each learner, observing and analyzing their practice and their behavior. To become aware of the decisive relevance of their implicit, subconscious mechanisms (habits, attitudes, beliefs), the quality and meaning, as well as the need to establish a permanent dialogue between the conscience and the subconscious (Kahneman's System I and II, 2015) to reconstruct those that limit its growth possibilities and stimulate those that enhance them.

On the other hand, and to better understand what we consider human knowledge, it is necessary to attend to another substantial contribution of neuroscience (Damasio 2010, Aguado, 2015, 2016; Immordino-Yang and Damasio, 2007): the primacy of emotions. Human beings are not thinking beings who feel, but sentimental beings who think. We embrace or reject ideas, situations, or people by the emotions that they arouse in us. The human brain is not a dispassionate, objective and neutral calculating machine that makes reasoned decisions, based on the cold analysis of the corresponding facts, it is rather, and, above all, an emotional instance, concerned with survival, which seeks satisfaction and avoids pain and suffering. Nobody can learn anything in a relevant and lasting way unless what is going to be learned to motivate them, affects them, tells them something, has some "built-in" meaning that ignites their curiosity. For this reason, play, a combination of curiosity, activity, and pleasure, is the most powerful weapon of learning, especially in the early stages of human development.

Emotion is the hue, tone, or color with which we perceive the stimuli of reality based on their positive, negative, or neutral potential first for our survival and later based on interests, intentions, values, and purposes of our vital project. Far removed from Manichean dualisms, to understand human development we need holistic views that understand the interaction of body and mind, emotions and reason, consciousness and subconscious mechanisms, the self and the other.

We can affirm that emotions are the energy that activates learning, therefore, educational pedagogy has to design contexts, programs, and activities that are relevant to the daily life of learners, that stimulate their desire to discover, investigate, experiment, satisfy needs and pursue their expectations, illusions, and dreams. Understanding interaction, stimulation of resonance, and personalized education are clear pedagogical derivations of this key contribution from neuroscience.

These discoveries force us to rethink the concept of human learning and to redefine it as a continuous process of construction, deconstruction, and reconstruction of the web of emotional and cognitive, conscious, and subconscious representations that govern our perceptions, interpretations, decision-making, and behaviors. Faced with the idea of learning as the acquisition or incorporation into the mind of a knowledge that was not in it, the science of learning today assumes that, at every moment of life, learning is to change what we already are. Learning is transforming the information that one receives to turn it into one's own, autonomous and active knowledge to understand and act (Pozo, 2014, 2016).

The educational school, not only instructive, must assume the responsibility of preparing future citizens to understand and interpret technical, political, economic, and cultural complexity, navigate in uncertainty, develop jobs unknown until now, create new alternatives, participate in the collective life of a global and local world. It is required to develop cognitive and affective qualities of a higher order: the development of the most valuable human skills or qualities. In other words, informed, independent, and creative practical thinking, leaving the tasks that consist of cognitive routines and operational routines of a reproductive and algorithmic nature in the hands of the machines.

NEW PEDAGOGICS

Being educated means, therefore, in my opinion, rebuilding not only conscious and explicit mental models. But in a very special way, the mechanisms, habits, beliefs, and unconscious and tacit mental maps that we build under our concrete experiences and that govern our desires, inclinations, interpretations, decisions, and automatic reactions. This reconstruction of the autopilot requires experience, action, and reflection on the meaning and effectiveness of our action (Korthagen, 2017a, 2017b; Soto Gómez, 2016). Education being precise and conceived in this way, no one educates anyone, each one must assume the commitment to educate themselves, to self-direct, self-organize, to design and develop their life project as people, citizens, and professionals. In other words, the purposes of the school must focus on the purpose of helping each learner to build their life project (personal, social, academic, and professional) to travel their path from information to knowledge and from knowledge to wisdom (Pérez Gómez, 2012, 2017, Maxwell, 2013, Davidson, 2017). What is needed is a curriculum, a pedagogy, and a school setting that help each individual to construct themselves uniquely and creatively, to build the most powerful cognitive and emotional resources to face complexity and uncertainty.

If the desired purpose is wisdom, that is, the best practice thinking, the purpose of the school or any institution dedicated to the training of citizens can no longer be located in the teaching and learning of disciplinary contents. It should rather seek the singular development in each individual of the substantial dimensions of their personality. That is, of the qualities, capacities, or competencies as complex systems of understanding, self-organization, and performance, which include, at the same level and with the same relevance, knowledge, skills, emotions, attitudes, and values as their essential components. These systems of understanding and action are the real resources with which the human subject operates. We can call them capacities, qualities, human competencies, or practical thinking (Pérez Gómez 2009, 2012, 2017, Perrenoud, 2010, Korthagen, 2017a, 2017b, and 2018). They intend to cover the integral development of the human being, including a triple knowledge: knowing how to think, know how to communicate, and know how to act. With this being important, the relevance of the competencies, practical thinking or human qualities construct goes much further, it resides in the incorporation of "wanting", of emotions, desires, attitudes, and values as indispensable elements and as relevant as knowledge or skills to understand the complex nature of human action and compression. In short, for me competencies are complex, personal, understanding, and action systems, that is, personal combinations of resources (knowledge, skills, emotions, attitudes, and values) that guide the interpretation, decision-making, and performance of human individuals in their interactions with the setting in which they inhabit in personal, social and professional life.

Now, this new and promising purpose requires a new pedagogy with the following most notable characteristics:

- The resources, conscious and unconscious of understanding and action are acquired, rebuilt, and consolidated in action. Therefore, its educational reconstruction requires experience, experiences, and reflection, as well as prioritizing the formation of the subjective dispositions of the students through the analysis and reflection of the practice itself, the attitudes, beliefs, and conscious and unconscious habits that condition their ways of perceiving, interpreting, making decisions, designing and acting. The mere transmission of declarative knowledge, facts, concepts, and theories does not guarantee that in practice the resources that determine the understanding and action of future professionals are activated adequately.
- This learning to think, communicate and do, requires reconstructing the resources, conscious and mostly unconscious, that we use to perceive, understand, make decisions and act in a complementary dialectical movement that in pedagogy could be expressed as "the theorization of practice and experimentation of the theory". The relatively harmonious and coherent development of practical thought requires permanent processes of investigation and reflection on action, a continuous round-trip path, from intuitions and habits to theories and from theories to intuitions and habits, (Korthagen, 2017b; Korthagen and Nuijten 2017, 2018; Darling-Hammond, 2010, 2019). In short, the reflective strengthening of practical experiences, related to authentic problems in real, face-to-face, or virtual contexts.

- On the other hand, and given that the relevance of the experiences is related to the irreducible singularity of each human subject, a decisive commitment to personalizing teaching is required, which implies the transition from a very one-size-fits-all model, centered on the teacher, typical of the industrial era of the nineteenth century, to a model centered on the apprentice. The current challenge consists of provoking the personalized development and to the maximum of their possibilities of each one of the apprentices, celebrating the diversity, the uniqueness of each one, respecting the discrepancy, and helping especially those who need it most. Decide on the "real" equality of opportunities, that is, opportunities of equivalent value, which allows personalized teaching (Pérez Gómez, 2010). Strengthen the feeling of self-determination through the experience of competence, autonomy, and relationship capacity.
- In this regard, it should be emphasized once again that the complexity of the contemporary era with its possibilities and demands requires, within the framework of this personalized teaching, the development of higher-order cognitive and affective capacities. We are not talking about mere learnings of rote reproduction of data, facts, dates, concepts, and simple algorithms. We refer to the capacity for analysis, contrast, design, experimentation, evaluation, and creative innovation. That is, the ability to look at life around us in a disciplined, critical, and creative way. Take advantage of the power of human cooperation and solidarity, learn to communicate effectively, develop the capacity for personal self-regulation, learn to correct mistakes, and learn ubiquitously and constantly throughout life.
- For this purpose, it will be essential to organize the training curriculum around cases, situations, problems, and projects. That is to say, start learning from the little territory instead of the map, with the question instead of the answer, assuming the pedagogical principle "first the experiences and then the formalizations". Scientific, humanistic, or artistic disciplines offer the best available knowledge, but their epistemic logic should not impose a linear and mechanical pedagogical strategy. Knowledge should be the best instrument, the most powerful tool to analyze, understand, design, develop and evaluate the cases, problems, and projects that arouse the curiosity of the learner, in situations in which the solution is not obvious, nor the peculiarities of the trouble. The curriculum must put the student in challenging, provocative situations.

It is, in my opinion, one of the fundamental competencies of contemporary teachers: didactic transposition. That is, the ability to design and plan, in each field of knowledge and doing, didactic strategies, programs, and tasks. That involves the apprentice in real, face-to-face, or virtual cases, situations, problems, and projects, closely linked to the context of social or professional practice, timely and relevant for the social community and the apprentice's professional training.

- On the other hand, for the development of practical thinking or wisdom, metacognition acquires special relevance in this complex process of training and reformulation of practical knowledge of any professional, but especially of those who, like teachers, move permanently in the territory of human interactions to help grow and learn. Metacognition aims to know what we think and how we feel about thinking like this; it is a privileged strategy to train competent experts in the creative and wise autonomous management of knowledge, capable of defining new problems and proposing novel alternatives.
- The new pedagogy is committed to new ways of teaching, of designing contexts and activities, and uniquely, new ways of understanding and developing evaluation. It will be essential to promote formative, educational evaluation, consistent with the purposes of this new pedagogical culture. This implies promoting evaluation that helps to improve learning processes, that is, stimulating the processes of self and peer evaluation, the recognition of error as an opportunity for learning, the use of procedures, such as the portfolio, the observation of the practice, debate, close tutoring. It is not difficult to accept that in the current school system there is a hypertrophy of qualification or summative evaluation and atrophy of the formative evaluation.

- Truly important personal processes are complex enough and go beyond the pretense of measuring them by common standards. They undoubtedly require the use of unique standards, adapted to the diversity of itineraries and personal ways of acting and creating.

In summary, a new pedagogical culture requires a firm commitment to active, reflective, cooperative, and personalized teaching, which makes it easier for each boy and girl to build their academic project and develop their personality more completely, rehearsing, experimenting, and discovering the real problems of the context, in permanent interaction with the members of their community. It is not necessary or convenient for everyone to learn the same language, the same mathematics, the same geography, or the rest of the disciplines at the same time. Some can learn it before and others later in correspondence with the uniqueness of each subject, depending on how their own academic and personal project needs it, linked to the real problems of the context and the community in which they live.

Consequently, it is for me a priority responsibility of the contemporary school to create healthy contexts and learning communities, scenarios, contexts, relationships, and projects, virtual and face-to-face, that facilitate and stimulate experiences and challenges of high quality and maximum relevance to help citizens to face the complexity, change, and uncertainty of the contemporary world. Create learning communities, spaces for high-level cultural experiences. More schools that are open and fewer closed classrooms. The school setting, the set of elements (curriculum, pedagogy, organization of space, time, and relationships) that surround educational exchanges, really constitutes the message that slowly but effectively penetrates the student and the teacher, configuring their knowledge and practical thinking. Habitat conditions habit. Therefore, it is possible to propose the transition. From the context of inculcation of the academic and transmissive school inherited to the context of production, of creation of the democratic, open, and creative school (Apple, 2017; Pérez Gómez, 2012, 2017; Robinson, 2011). That is, a school context in which democracy, challenging research, healthy and trusting relationships, and useful, creative, and relevant material and intellectual production are lived, experienced.

A NEW TEACHER AS A PEDAGOGIC PROFESSIONAL

This new pedagogical culture requires a new way of conceiving the role and professional development of teachers. In a very brief way, it should be noted that teachers in the digital age must firmly assume that we are learning professionals. Our professional commitment is to help apprentices to build their unique life projects to the maximum of their possibilities. That is, the key transition from the teacher as a transmitter of information to the teacher as a tutor of the learning of each one of the learners is required. Professionals with a passion for knowledge, discovery, science, arts, and culture and with a passion for helping each apprentice learn are required. The teacher as a tutor of people who learn to investigate experiment and live and not only as a tutor of disciplines is the key to the new role of the teacher in the digital age. The expert and close help of the teacher so that each learner builds in a disciplined, critical and creative way their own unique personal, academic and professional project is more necessary than ever, especially for those who need it most (Zeichner, 2010; Korthagen, 2018; Pérez Gómez 2010, 2010ª, 2017, Darling-Hammond, 2019). The qualities of practice as design in complex and uncertain situations can be learned, but they cannot be taught through instruction, but through experimentation, tutored, and cooperative trial and error. The educational intervention of the teacher to help learn in the complex scenario of the digital age requires both "coaching" and "teaching" (Lunenberg, Dengerink & Korthagen, 2014).

This teacher requires more complex and different professional qualities and competencies than those traditionally required, to face an activity as rich as it is difficult: provoke, accompany, question, guide, and stimulate student learning. What is decisive is that the teacher has assumed the tutorial nature of their professional role. That they understand that what gives meaning to their task is to help learn, to build criteria of interpretation and action in the storm of information, in the Tsunami of stimuli. To live relevant quality experiences, to help each individual to educate themselves as cultured, supportive, and autonomous citizens, without forgetting that teaching is a profession in which motivations and affections play an essential role. This function will be carried out coherently, but in very different ways, under the different situations and people with whom they work. More than teaching disciplinary content, teachers teach people how to

educate themselves, how to build themselves as singular autonomous subjects, using the best tools offered by the accumulated knowledge of humanity.

In this changing and complex context, teachers are permanent learners of the students' learning processes. To help them to direct themselves, to ask themselves the relevant questions, to face complex problems. Sowing doubt and discovering methods of search and inquiry. To distinguish worthy information, to connect with strangers in virtual networks and interact with them based on a shared project or a common interest, to preserve identity and anonymity when necessary. The teacher has to be able to exemplify these inquiry processes in the broad, fascinating, chaotic, and complex virtual territory that opens horizons as enriching, as they are uncertain to the lives of individuals (Wagner, 2010; Pérez Gómez, 2017). Schank (2010) considers that the most effective way to teach new skills is to place learners in the type of complex, changing, and uncertain situations in which they need to use these skills, and to provide close tutoring to help when they need it. In this way, they learn in a relevant way when, why, and how to use certain strategies, in these contexts of perplexity.

Among the professional competencies of contemporary teachers, I would highlight the following (Pérez Gómez, 2017):

- Ability to understand and diagnose phenomena, situations, processes, and educational systems. (AI Cooperative)
- Ability to coded, plan, develop and evaluate the curriculum in a personalized manner.
- Create powerful learning contexts and mutual support learning communities. Social contexts are permeated by the ethical values of democratic coexistence, solidarity, and social justice and epistemic contexts saturated by the demands of scientific research, design, and artistic and technical experimentation.
- Ability to self-regulate and develop professionally throughout life.

HOW DOES THIS NEW TEACHER DEVELOP?

It seems evident that the training of the teacher who requires the current educational challenges must face not only the acquisition of academic and pedagogical knowledge but also the consistent and lasting learning of the previously targeted professional competencies. This means learning by doing, experimenting, reflecting, rectifying, reconstructing knowledge, habits, emotions, attitudes, and values. The subjective provisions: habits, attitudes, emotions, and values are not dissolved by the exposure of the individual at merely theoretical interactions, academic learning, or sermons of adults. Therefore, we find too often as much distance between proclaimed theories and the theories in use (Argyris, 1990), between the processor and the human executing, between what we think, we say, we feel, and do.

Learning to think, communicate and do, as contemporary teachers, requires reconstructing resources, conscious and mostly unconscious, which we use to perceive, understand, make decisions and act on the school scenario. It seems evident that the practical knowledge of the teacher-that is, the intuitive and unconscious schemes of pedagogical comprehension and action-are only formed and reconstructed, through practical experiences in real school contexts, theorizing practice, and experiencing the theory. The lessons, theoretical courses, instructions or tips above, or external, oral or written communication, of ideas or suggestions, can help but are insufficient to provoke the real restructuring of pedagogical habits or beliefs that constantly influence our interpretations and in our reactions in daily, personal and professional life (Lipton, 2016. Korthagen, 2017, 2018).

Thus, the relatively harmonious and coherent development of practical pedagogical thinking requires permanent processes of investigation and reflection on action, a continuous path of permanent return, of intuitions and habits to theories and theories to intuitions and habits. The reconstruction of these mechanisms as decisive, fundamentally unconscious, requires the strengthening of practical experiences, related to authentic problems in real, eye-friendly, or virtual contexts. Only by reflection on the practice, it can emerge a knowledge that is born of experience and that brings theories proclaimed to the theories in use (Argyris and Schön, 1998, Korthagen, 2005, 2017, 2018, Contreras, 2010; Soto et al., 2015). It is

necessary to promote an experiential and reflective practice, so that it is not reduced or to acquire patterns of action without theoretical meaning, nor to acquire theoretical frameworks that are not accompanied by effective patterns of action. The development of pedagogical competencies requires emphasizing the training of thoughtful and collaborative professionals through experiential learning (Kolb, 2014).

Research/Cooperative Action, through the strategy called Lesson Study, experienced in Japan for more than a century, offers, in my opinion, an excellent opportunity to help in this complex and committed change in the pedagogical culture of the teacher both in the Initial training as in the permanent training (Soto Gómez et al., 2015, Elliott, 2015).

First, because it breaks the isolation of teachers in all phases of the development of their practice: diagnosis, design, planning, execution, and evaluation. Secondly, because by cooperation it clothes each agent involved in the traveling complex towards the transformation of their beliefs, attitudes, and extraordinarily resistant habits (Lipton, 2016). Third, because by linking the transformation of the pedagogical thinking of teachers to concrete curricular experimentation, as Stenhouse defended it, it allows lasting changes based on evidence from both curriculum and teachers.

The LS stimulates and facilitates relevant learning, inspires and induces to behave as reflective practical professionals (Pérez Gómez, 1998, 2010, Darling-Hammond et al., 2019; Elliott, 2015; Soto et al., 2015). Through participation in Academic contexts and professional pedagogically powerful experiences, along with extended periods of tutoring learning in contexts, face-to-face and virtual, teaching and research, living the academic culture of reflection and action.

These dialectical dilemmas and movement, inherent in any process of human training in general and in a very special way and accentuated in teacher training, point to the complex and relevant pedagogical strategy of fostering disciplined improvisation, respectful at the same time with the richness of the creation and rigor of knowledge. Dewey considered that the human being existed four basic impulses that made up its nature: communicate, build, investigate and express. Creative expression is today more relevant than ever, because the vertiginous change caused by the exponential increase in information and knowledge requires new ways of understanding, communicating, and doing.

How to form such provisions in the initial training? The training of 21st-century teachers requires, in my opinion, a radical change. Not a mere cosmetic or bureaucratic change of names or accounting in the roles. But a substantial change of the look, culture, and practices that are currently developed (Stigler and Hiebert, 1999, Mumby, Russel and Martin, 2001, Cochran Smith, 2007, Linda Darling-Hammond, 2005, 2019, Zeichner, 2008, Korten, 2018). Expert professionals are needed in their respective areas of knowledge and at the same time, committed and competent to provoke the relevant learning of students, because teaching that fails to cause learning loses its legitimacy. However, few doubts can fit that the faculties of education sciences and teacher training institutions in our context are far from the ideal that involves the training of competent teaching professionals for the task claiming education in the digital age, as we have considered it here.

A curriculum based on practice is required. Focused on problematic situations, developed on integrated projects that actively involve future teachers in authentic tasks on real scenarios and contexts. Where they learn to educate in cooperatively living authentic educational innovation processes, intervening in the complex contexts of the classroom, checking the difficulties and resistances that the current school device imposes, the restricted and insufficient spaces, the inflexible times, the scarce resources, the mediocre expectations of a large part of the agents involved. Designing and experimenting in collaboration, reflecting on the practice itself, analyzing and debating the possible alternatives of improvement, accessing referents, examples, and alien models theoretical and, of course, learning to rectify errors and deficiencies. It will be urgent to design the third space as proposed by Zeichner (2010). That is a complex and complimentary scenario of experience and experimentation in school contexts and debate, reflection, and inquiry at the university throughout the years of the training career.

The third space that stimulates the cooperation of two territories (school and university) so distant and incommunicado in our recent history, will force us to reinvent both in the atmosphere of rigorous inquiry, risky experimentation, and creative innovation. The creation is based on three complementary pillars, which are frequently proposed as irreconcilable: novelty, rigor, and relevance. The quality of creative expression

requires knowing and rethinking the criteria that in each disciplinary or interdisciplinary field has been configured as foundations of quality and relevance. It is not an expression in a vacuum but settled in theoretical, empirical, and experiential knowledge, assumed by the community in complex processes of debate, contrast, criticism, experimentation, and alternative formulation.

At the same time, it does not induce or conform to the mere reproduction of what is already built, of the inherited. Creativity is stimulated and feeds in open, living contexts, where trust and stimulus reign to personal initiative, to different ways of understanding and expressing, where the error is considered a chance of learning and where defiant and complex projects are promoted In which apprentices have to rehearse and propose alternatives (Kettler et al., 2018). This spirit of creative shared and promoted inquiry in research communities (Bailin, 2010) is the one that is precipitated in what we can call the creation, expression, or disciplined improvisation, excellently exemplified in jazz-free sessions. Educational teaching contains a very important creative component, where creative agents share feelings, knowledge, habits, techniques, rhythms, and patterns, and within them and sensitive to different contexts and apprentices, move freely giving loose rein to the expression of their emotions, feelings, and dreams.

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