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MORE THAN A CENTURY OF EDUCATIONAL PSYCHOLOGY: OVERVIEW AND FUTURE PROSPECTS

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The aim of this article is to review the course of educational psychology over its more than 100 years of history. Educational psychology, like the other divisions of the discipline, has undergone a profound evolution since its inception, driven by significant economic, technological, scientific and social changes. Throughout this article we present some of the results of this evolution, which as in any other human activity, has been full of ups and downs. The way this field has evolved can be seen most clearly through a consideration of the four broad areas of education: teaching, learning, content and context. In the final reckoning, the balance is highly positive, though we should not overlook the criticisms to which it has been subjected throughout these years. The article concludes with a proposal that accentuates the specific, original contribution of educational psychology to the world of education and the need for all interested parties to show their firm belief in putting it into practice.
Key words: *Educational psychology, Teaching, Learning, Intelligence, Learning strategies, Learning models, Instructional psychology.*

El objetivo de este artículo es hacer una revisión de la psicología educativa en sus más de 100 años de existencia. La psicología educativa, como el resto de las ramas de la psicología, ha evolucionado profundamente desde su nacimiento en el siglo pasado hasta el momento actual, impulsada por fuertes cambios económicos, tecnológicos, científicos y sociales. A lo largo de este artículo se exponen algunos de los resultados de esa evolución que, como ocurre en toda obra humana, están llenos de luces y de sombras. Esa evolución se hace especialmente visible en los cuatro grandes ámbitos de la educación: la enseñanza, el aprendizaje, los contenidos y el contexto. El balance global resulta muy positivo, aunque no conviene olvidar las críticas recibidas a lo largo de todos estos años. Se termina con una propuesta que acentúa la contribución específica, original, de la psicología educativa al mundo de la educación y la necesidad de que todos los interesados en ella crean firmemente en las posibilidades de llevarla a cabo.
Palabras clave: *Psicología de la educación, Enseñanza, Aprendizaje, Estrategias de aprendizaje, Modelos de enseñanza, Psicología instruccional.*

EDUCATIONAL PSYCHOLOGY: ITS PRINCIPAL STAGES

Educational psychology is a relatively young science, but its roots stretch back to the distant past. Indeed, we might say of it what has been said of experimental psychology: that it has a long past and a short history (Boring, 1950). Our discipline probably emerged, according to Berliner (1993), inadvertently from popular traditions related to the upbringing of children. For example, the ancient Jewish ritual of the Passover is echoed in Cronbach and Snow's (1977) model of today, anticipating by hundreds or thousands of years their famous educational system based on interactions between aptitude and treatment. The leader of the Passover service was obliged to tell the story of the Passover each year, but he was to tell it in a different way to each of his children, according to their individual differences.

From the discipline's long history we can highlight some eminent figures who laid down its roots. Democritus (5th century BC), for example, wrote about the advantages of schooling and the influence of the home on learning. A century later, Plato and Aristotle (4th century BC) discussed many aspects of what we consider as educational psychology: the purposes of education, differential education, development of psychomotor skills, character building, the possibilities and limits of moral education, teacher-pupil relations, teaching-learning methods, and so on. Quintilian (1st century AD) defended public versus private education with the aim of preserving democratic ideals; condemned the use of physical force as a disciplinary method, recommending good-quality teaching and an attractive curriculum for solving behaviour problems; advised teachers to take into account individual differences; and set down criteria for

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teacher selection. But we should also do justice by an exceptional figure and a pioneer in educational psychology, Luis Vives (1531), and his work *De tradendis disciplinis*. Berliner (1993) goes so far as to say that Vives was hundreds of years ahead of the most prominent figures in our discipline as regards such essential matters such as the art of teaching, individual differences or assessment:

> *"…Vives wrote very much as a contemporary educational psychologist might in the first part of the 16th century (Vives, 1531/1913; Charles, 1987). He stated to teachers and others with educational responsibilities, such as those in government and commerce, that there should be an orderly presentation of the facts to be learned, and in this way he anticipated Herbart and the 19th-century psychologists. He noted that what is to be learned must be practiced, and in this way he anticipated Thorndike's law of exercise. He wrote on practical knowledge and the need to engage student interest, anticipating Dewey. He wrote about individual differences and the need to adjust instruction for all students, but especially for the "feeble minded," the deaf, and the blind, anticipating the work of educational and school psychologists in special education and the area of aptitude-treatment interaction. He discussed the schools' role in moral growth, anticipating the work of Dewey, Piaget, Kohlberg, and Gilligan. He wrote about learning being dependent on self-activity, a precursor to contemporary research on metacognition, where the ways in which the self monitors its own activities are studied. Finally, Vives wrote about the need for students to be evaluated on the basis of their own past accomplishments and not in comparison with other students, anticipating both the contemporary motivational theorists who eschew social comparisons and those researchers who find the pernicious elements of norm-referenced testing to outweigh their advantages. Thus, long before we claimed our professional identity, there were individuals thinking intelligently about what we would eventually call educational psychology. Our roots are deep within the corpus of work that makes up Western intellectual history", p.39.*

Among other prominent figures we should mention is Comenius (1657), who influenced psychoeducational thought through his texts based on developmental theory and argued for the use of visual aids in teaching. He recommended that teaching begin with the general, moving on progressively to the particular. The aim of teaching was not memory, but understanding. Descartes and Locke defended opposing positions: Descartes (1596-1650) stressed the importance of innate ideas as the basis of knowledge, whilst Locke (1632-1704) highlighted sense impressions, that is, experience. But all specialists in the field agree on acknowledging Thorndike as the father of educational psychology. Thorndike trained in experimental psychology, first with James at Harvard and later with Cattell at Columbia, and can be considered above all as an experimental designer in the field of education.

The history of educational psychology *per se* dates from the period between 1890 and 1920 (Beltrán, 1983, 1984; Zimmerman & Schunk, 2003). In reality, educational psychology is born, as Hothersal (1984) argues, in 1892 when Stanley Hall calls 26 of his colleagues to his study to form the American Psychological Association (APA). Back then, the APA was synonymous with educational psychology. In a short space of time there were some decisive contributions that made possible the birth of this science, and in turn, the adventure of uniting two worlds as complex as those of psychology and education. The period in question covers the terms of six APA presidents: Cattell, Dewey, Hall, Judd, Seashore and Thorndike, and is the era of other titans in the field such as James, Woodworth, Warren and Yerkes. All believed that psychology would revolutionize education, and many educators were keen to give the new science that chance. This is the phase of the **foundation** or formal constitution of educational psychology.

A second phase corresponds to the period 1920-1960. In this case we can talk about **consolidation**. By the end of its first phase of development, educational psychology had already established a clinical base, focusing on such sensitive areas as learning, human abilities and educational performance. It also covered developmental aspects, individual differences and psychological measurement. That is, it was equipped with theories, measurement instruments, research designs and statistical analysis methods for making useful contributions to educational practice. But in the 1940s educational psychology, initially well established as Division 15 of the APA, was on the point of disappearing because it lacked

a field of its own, since other Divisions, such as Assessment, Personality or, above all, School Psychology, addressed the same aspects. Moreover, the approaches were antiquated, there was little significant research in scientific journals and curricula were ambiguous and subject to the fashion of the day. Several times it was thought to eliminate or reorganize the Division, but things began to change to such an extent that Gage (1961), President of the Division, ventured that educational psychology would occupy a privileged position in the 1960s-70s.

The third phase, 1960-2011, is one of **boom**. **As** Gage (1961) had anticipated, by 1966 it was already the third largest Division of the APA in number of members, surpassed only by number 8, Personality and Social Psychology, and 12, Clinical Psychology. From then on we saw a period of powerful growth until it came to occupy a prominent position in the scientific world – given both the greatly increased numbers of those exercising the profession and the quantity and quality of research in the area – and thereafter, a relatively steady development of the division. With the occasional setback, but mostly a series of unqualified successes, the area has maintained itself with dignity – even brilliance – in most countries, both as a discipline and as regards professional and research activity.

However, in the last 20 years, educational psychology has gone through a somewhat controversial phase, with strong calls for it to redefine its identity. Four dates are of particular significance: 1992, 1996, 2003 and 2006. In 1992, educational psychology celebrated the centenary of its founding. The journal *Educational Psychologist*, the organ of expression for those working in the area (APA), published a series of articles reviewing the discipline and calling for educational psychology to redefine itself or, at least, refine or clarify its true mission in the educational field. In 1996, *Educational Psychologist* published another series of articles, again reviewing the status of educational psychology. That same year, Sternberg (1996b), who shortly afterwards would be elected President of Division 15, educational psychology, published a famous article in which he announced its fall and its possible recovery. Using a well-known advertisement for senior citizens that included the phrase "I've fallen down and I can't get up", he applied it to educational psychology, pointing out that educational psychology had fallen down, and could not get up unless it were able to clarify its own role. The solution would be, he said, to identify the core of the area, which is none other than the *teaching-learning* process correctly interpreted.

In 2003, Zimmerman, at the time President of the educational psychology division, felt the need to come to the aid of the discipline, and asked for the help of experts to demonstrate how much educational psychology had contributed to education and to psychology in general. It was in this context that Zimmerman and Schunk's (2003) monumental book *A century of contributions* was published, a work that highlighted the most brilliant figures in world psychology, represented by their most significant, original and valuable work. In 2006, *Educational Psychology in Practice*, celebrating its 25th birthday, made a review of educational psychology, analyzing its current problems, and above all, looking to its future. Other sources of information, such as conferences or everyday work in the field of educational practice, have also highlighted educational psychologists' concern over a possible loss of influence in the area of education, and above all, a clear waning of enthusiasm among psychologists themselves in comparison to other eras.

Today, although things have calmed down considerably, questions are still raised about the present and the immediate future of educational psychology, especially in the professional context. Therefore, a decade into the 21st century, it is a good time to take stock, considering the criticisms – what educational psychology has failed to do – but also its positive contributions, which are much more numerous, and have conferred on it the status of an outstanding scientific field. Taking account of the criticisms of educational psychology will help to improve its practice, while consideration of its contributions helps keep it on the right course and reinforce its legacy.

CRITICISMS

Jackson (1981) points out four failings in Thorndike's original proposal: a) a failure to distinguish between the goals and methods of the physical sciences and those of the social sciences: for Thorndike, people were as easy to study as rocks and animals; b) a failure to pay attention to the social and historical contexts in which people lived and in which schools operated; c) a blind belief that all the achievements of science were desirable, despite the horrors of Hiroshima; and d) overlooking the aesthetic dimension of science, since the art of educational psychology should be as alive as it is in any other branch of science.

Grinder (1989) argued that educational psychology has three principal problems: withdrawal, fractionation and irrelevance. In his opinion, educational psychology had distanced itself from any responsibility for education, focusing on the limited setting of experimental psychology and the laboratory; fractionation had become a critical problem, given the lack of connection with practical material and genuine classroom processes; moreover, there was no common basis among educational psychologists themselves, though this was unsurprising considering the extent of the differences in their training backgrounds (some receive their training in schools and others in university departments; some have classroom experience prior to becoming qualified, while others do not; some see the role of educational psychology as focused on the teacher's credentials, others on aspects such as intervention or training).

Wittrock (1992) highlights, above all, the disadvantages of the applied nature of educational psychology – evident, for example, in the tendency to select for their study those educational problems to which we can apply solutions developed in other contexts, overlooking real problems simply because they have not been addressed in other fields of psychology. At the same time, he points out the advantages of defining it as an independent science: concentrating research, teaching and intervention on authentic educational problems, unifying the contributions of educational psychology with psychology and with education, and improving the self-concept of educational psychologists, and thus helping to avoid the feeling of receiving loans from other areas.

Mayer (2001) complains that the prophets of doom have been for so long announcing the death or debilitated state of psychology as an influential force on education, when for him, far from being weakened, it is a vibrant field that has experienced unparalleled success in the understanding of educational problems.

Briefly summarized, the most common criticisms would be as follows (see Table 1):

- ✔ crisis of identity (status): what educational psychology is, and
- ✔ crisis of influence in the world of education (role): what educational psychology does.

Both refer to the current status of educational psychology, that is, what we are and what we do (for a fuller clarification of the specificity and functions of the educational psychologist, see the article by Fernández in this same issue).

CONTRIBUTIONS

Many experts have enumerated and described the contributions of educational psychology to education, to psychology and to science in general. Berliner (2003) highlights the personal contributions of four giants of psychology: James, his pupil Hall, Hall's pupil Dewey, and Thorndike, the first three preparing the way for the great victory of Thorndike, also a pupil of James. In referring to James, Berliner notes that he highlighted the utility of psychology with respect to education in three vital aspects: providing support for beliefs about teaching, safeguarding teachers from making certain egregious errors, and lending them support in some of their pedagogical decisions. To this we should add his interest in changing the behaviour, intelligence and personality of the student. As for Dewey, Berliner approves of his idea of educational psychology, understood as a set of working hypotheses more than as a set of valid findings ready to be applied, which was also Thorndike's view. But in any case, Thorndike was Berliner's greatest hero.

Mayer (2001) notes the great contributions of educational psychology to cognitive theory and educational practice, though he recognizes the difficulty of being an educational psychologist in the 21st century, since for our colleagues from psychology we are "too educational" – a pejorative label that reflects our interest in focusing on educationally relevant problems rather than laboratory tasks – and for our colleagues from education we are "too psychological", an equally derogatory description that refers to our interest in basing educational practice more on the methods and theories of scientific research than on popular opinion. According to Mayer, our role as educational psychologists is a matter of concern for psychology, given our refusal to accept the

TABLE 1
MOST COMMON CRITICISMS

- ✔ epistemological reductionism; confusion between physical and social sciences
- ✔ overlooking the social and historical context of human beings
- ✔ distancing from the great educational problems
- ✔ fractionation or lack of connection with classroom material and processes
- ✔ lack of a common basis among educational psychologists
- ✔ absence of a defining core of its nature and mission
- ✔ overlooking the individual case
- ✔ crisis of identity
- ✔ mediocrity in professional practice
- ✔ scarce influence in the educational world
- ✔ educational irrelevance
- ✔ internal weaknesses; needs redefinition

artificial research of the laboratory as the end point of psychological study, and for education, in view of our reluctance to accept the good intentions or opinions of experts as rational explanations of educational practices. The truth is, in Mayer's view, that it is precisely the combination of the two types of criticism that generates the unique potential of educational psychology for advancing in psychological theory and educational practice. Among its specific contributions, he refers to its desire to produce general scientific theories of learning, which are valid in the school context and address specific curricular content.

We could go on mentioning the contributions referred to by the various experts, but it would be a very long list, and in any case, the work by Zimmerman and Schunk (2003), already mentioned, makes an excellent job of this. What their format highlights are the historical, individual contributions of the great figures of psychology; the result is a catalogue of protagonists and their corresponding contributions. In the present article, on the other hand, we shall evaluate these contributions, following a model that is more systematic than hagiographic, revolving around the four principal axes or vectors to which, according to the experts, the essence of education can be reduced: teaching, learning, what is taught and learned , and the context in which teaching and learning take place. In this way, what we obtain is not merely a list of isolated or specific contributions, but rather a thread, a story, which allows us to discover the process of evolution and change that education has undergone through the initiatives of educational psychology, giving us an idea also of the different features that have appeared on the face of education as educational psychology has shone its light upon it and its core of educational problems. As a result we shall be able to contemplate a fuller and more objective picture.

Teaching

The great challenge for Thorndike (1903, 1910, 1913) on founding educational psychology was to produce *changes* in the intelligence, personality and behaviour of human beings in all areas of life, and principally in the school context. According to his proposal, educational psychology could help education above all in relation to the content and methods of teaching. His aim was to overcome two of the great burdens of education, the ideological nature of its content (substituting it by scientific knowledge) and the traditional pedagogical routines of the classroom (substituting them by decisions that were scientifically grounded and open to empirical confirmation). This would strengthen the instructional educational paradigm revolving around teachers and their teaching. Thorndike succeeded in constructing a well-articulated theory, turning teaching into a genuine science – albeit a science founded on bases of an associationist nature, given that the new abilities to be acquired through teaching were in fact connections or associations of stimuli, or of stimuli and responses. In fact, the law of effect, discovered by Thorndike, would become a guiding principle of teaching, with correct actions being rewarded and incorrect ones discouraged. The goal was to supersede the old methods of teaching based on traditions or mere personal intuition, which overlooked real life and the interests of the child, and instead to address real, radical, compromising problems so as to stimulate thinking.

Going one step further in search of instructional effectiveness, Skinner (1953) redesigned school practices through the technification and mechanization of teaching, introducing into it the experimental analysis of behaviour or operant conditioning. This allowed him to present a theory of the acquisition of knowledge accompanied by an authentic technology that organized teaching in carefully prepared sequences. Through these, the individual acquired in global fashion the elements of a new and complex execution: without emitting erroneous responses on the way, culminating in an authentic programmed instruction (Skinner, 1970). The key here was in the reinforcement. Teaching involves the intelligent arrangement of reinforcement contingencies through which the student can learn in a better way. Children learn without teaching in their natural environment, but in the classroom, teachers have to use special contingencies to accelerate the appearance of the educational response that would otherwise not occur, or would come much more slowly.

The best-known application of Skinner's theory is that of teaching machines. One of the great advantages of the teaching machine is that it permits students to learn at their own pace, meeting goals in accordance with their own possibilities, without the pressure often found in classrooms due to the pace – too fast or too slow – of their classmates. Thanks to the machine, teachers can review the situation of an entire class very quickly, and above all, can individualize their teaching. This liberates teachers from routine, tiresome, seemingly endless tasks, and

allows them to devote their time to the scheduling and implementation of more profound educational activities and approaches.

Teaching in this case becomes a closed system whose content, objective and pedagogical strategies are pre-determined, and the material to be learned is mandatory and identical for the whole class. This instructional process, closed, linear and accumulative, does offer, however, learning without errors (according to the experts errors should never exceed 5%). The model has emerged as particularly interesting and effective in the learning of arithmetic, spelling and reading and for those with special educational needs. But Skinnerian teaching has some weaknesses (Moraleda, 1984). For example: it takes into account the external context of the learning, but it neglects the processes internal to the learner; it is an excessively linear, accumulative model that results in the mere accumulation of information; learning is governed by the all-powerful action of reinforcement; it converts the teacher into a mere programmer and supplier of reinforcement who is limited to sending students to the machine to rectify an error, instead of appealing to their awareness, their reflection, or their capacity for self-correction, creativity and discovery. Later, with the emergence of new information and communications technologies, there would be a return to teaching machines and to programmed learning, but now under different educational paradigms.

Both associationist and behaviourist theory provided, as we have seen, a coherent theory of instruction. But they were still *closed systems*, focusing more on the result than the process, and neither of them offered an analysis of students' thinking, so that they were inadequate for those interested in human understanding and reasoning. Teaching had attained the status of a science, but it had lost its subjects, and would have to recover them.

The weakness of the associationist and behaviourist ideas led experts to consider the proposals of Piaget (1950), which represent, in contrast, an open system that focuses not so much on the results but on the *process* of learning, giving priority to the active participation of students, the promotion of their interests and the development of their autonomy. For this, both goals and content have to be adapted to the student's developmental possibilities. However, and despite the impact of Piaget's theories on teaching, his model, in contrast to the specificity of the behaviourist models, became lost in theoretical generalities. Even so, and although he left no explicit theory on instruction, many of his ideas have been assimilated into educational practice (Peralbo & Dosil, 1994).

One of the leading figures behind the definitive take-off of instructional theory was Jerome Bruner. Bruner chaired the Woods-Hole (1959) Conference, organized soon after the Russians' launching of *Sputnik*, which gave quite a jolt to the American educational system. The outcome of that conference was the publication of *The Process of Education* (Bruner, 1960), in which two ideas stood out. The first of these was that what should be taught in each subject, rather than facts and methods, are structures and key principles. Each body of knowledge, each problem involves a basic core of ideas and characteristic way of thinking – a structure –, and that is the first thing that must be transmitted to students. The most important thing is that the child masters the core, the basic structure of each subject. As the child progresses in the learning of the respective subjects, the core will be deepened and broadened. This type of teaching brought many advantages: an understanding of the structures makes the subject more accessible to pupils, makes it easier to comprehend and remember, promotes more appropriate and effective transfer to other subjects, and above all, aids the application of these basic ideas inside and outside of school. And the second salient idea in Bruner's book was that all principles can be taught in some way to children at any developmental stage. This assertion rests on the argument that even the most abstract and complex ideas can be converted into an active or intuitive form that is within reach of learners, so that they can master the idea in question. Following from this, the school curriculum should be recurrent, non-linear, in spiral form, and based on discovery, going back over the core and structure of each subject at ever more complex levels.

A few years later Bruner (1966) published another book: *Toward a Theory of Instruction*, heralding the arrival of a new discipline in educational psychology: the psychology of instruction, with a clearly cognitive orientation. Bruner's central idea here was the distinction between theories of learning, which are descriptive, indicating the steps students take on the road to learning, and theories of instruction, which are prescriptive, and guide the activity of teachers so that their pupils will learn.

Bruner's work and its accent on recurrent, spiral-wise, discovery-based learning has had many followers. Some authors of reference in this new panorama of instruction would be: Gagné and Dick, (1983); Gagné and Rohwer,

(1969); Glaser and Bassok, (1989) and McKeachie, (1974). But above all it has served as a guide for adopting a clear and forward-looking cognitive direction. Now, educational psychology, with its cognitive approach, was in a position to offer a new perspective on *what to teach* (structures), *how to teach* (shaping, discovery, spiral-wise) and *where to teach* (within a context of broader problems). At the same time, this approach would only work if supported by adequate systems of assessment that guarantee a high level of educational quality (Fernández, 2008).

A teaching-related event of special relevance in the educational field was the publication by the APA (1995) of its famous "Principles of Learning", which substantially changed the educational paradigm that had prevailed up to that time – the instructional paradigm revolving around teaching and the person doing the teaching –, in response to calls from numerous specialists who, basing themselves on practice, had expressed their dissatisfaction with that educational approach. According to such experts, there have been three great paradigms of education throughout its history (Banathy 1984): institutional, administrative and instructional. The first is called *institutional* because what is taught and learned is decided by the governing institutions or powers. It is a centralized system of education whose primary goal is to transmit the ideology of those in government, and is generally found in less developed societies. In this case, the centres of decision are far removed from the consumers: teachers and students. The second paradigm, the *administrative* one, corresponds to semi-decentralized educational systems in which local administrations play a role. There is still indoctrination, ideology, but the centres for decision-making are closer to the recipients of the teaching. The third paradigm is called *instructional*. Within this paradigm, education is interpreted as a pedagogical system whose content is based no longer on ideology, but rather on a curriculum. And attention is centred on teachers and their teaching, supported by technology. As pointed out earlier, this paradigm gradually became consolidated with the emergence of educational psychology. But the new educational paradigm, inspired by the APA, altered the centre of gravity substantially, so that rather than being focused on the teacher and teaching, it became learner- and learning-centred. This is the paradigm we could call *personal* or *learner-centred*. What matters now is not so much to transmit knowledge, but rather to help students acquire it – that is, to help them learn. An interesting aspect of this paradigm is that its core assumptions, in contrast to the cases of the previous paradigms, lead to an emphasis on the processes and needs of the person who learns, rather than to factors external to the learning process, such as material resources, time available, the curriculum or information (Segovia & Beltrán, 1998). Thus, education began to recover its subject, until then inexplicably forgotten.

The personal or learner-centred paradigm was found to work best in the context of the theories of Gardner and Sternberg, who had strongly defended differentiated instruction, adapted to the intelligences of students. According to these authors, teachers should teach intelligence, all the intelligences, as well as content. This is the only way of reaching all the pupils, since in the opposite case, if only one intelligence is taught, many of them may disconnect and fall behind. It is not a case, of course, of teaching all the content with all the intelligences at the same time, but rather of alternating intelligences in the teaching of the content.

Within this new, cognitively-oriented, personal or learner-centred paradigm, four broad approaches or formats began to be adopted: 1) instruction of content as the essential objective of learning, in line with the traditional classroom pattern; 2) situated instruction that sets out to locate learning in cognitive tasks, both within school and outside of it; 3) instruction of cognitive abilities, which accentuates the importance of developing a repertoire of cognitive and metacognitive strategies in the context of an academic course or programme in conjunction with or separate from the curricular content; 4) mixed instruction, which accentuates both aspects: instruction of strategies and content. The first approach does not involve anything new, while the others bring some degree of innovation, and coincide in some essential elements. For example, they situate the *locus* of learning in the student, and their goal is the construction of meaning. Moreover, they consider learning to have little to do with isolated facts or basic, low-level skills, and place the emphasis on self-regulated learning. Finally, they stress the need to give depth rather than breadth, with regard to both content and abilities.

Although educational psychology has extracted knowledge and strategies from its own psychological roots, it has also been capable of acknowledging the achievements of other, related sciences, and has incorporated numerous, often brilliant research findings on the functioning of the brain in the learning process,

designing information-processing models that reflect the brain's capacity to understand, retain and reproduce knowledge using its different memory systems. The brain perspective offers a scientific explanation of how learning occurs in the classroom, and there has been a proliferation of books and programmes with titles like "brain-based differentiated learning", "brain-compatible learning" or "brain-based teaching" in recent years. The idea is to apply basic cerebral knowledge to educational psychology with a view to providing positive results in teaching and in the learning process. Such teaching strategies are expected to yield positive results (Bruer, 1999; Erbes et al., 2010; Jensen, 2006; Sousa, 2006) since it is through our understanding of brain structures and of cognitive functions that we can connect our learning capacities with instructional goals based on brain functioning. Among the basic principles, confirmed by experts, that can be of enormous benefit to teaching, are the following: the brain is a parallel processor that can carry out several activities at the same time; it has an innate tendency to look for meaning; it processes wholes and parts simultaneously; and it is activated by challenge and inhibited by threat.

Supported by the paradigm we have referred to as personal – education based on learning, on the learner and on recent research about the brain –, a new instructional current called "Schools for all kinds of minds" (Barringer, Pohlman, & Robinson 2010; Levine, 1992) has emerged in the last twenty years or so. It is based on the idea that differences in learning are a variation rather than a deviation. It sets out to be "neuroscience converted into educational practice", aiming to help teachers understand how to free their students from useless and unnecessary tensions whilst they construct knowledge using their own strengths and abilities, and it is guided by a belief that science and brain research can help us to see that people learn not in uniform fashion, but in a variety of ways. The result is a better understanding of the way in which each student learns, and a teaching approach that offers hope and optimism to all students, since such a context will improve their confidence in their ability to learn and increase their faith in school, which they can trust to help them.

As a consequence of the learner-centred paradigm, different approaches to attention to pupils' needs began being applied in schools, often involving the "segregation" of those with special educational needs, a situation that was later supposedly corrected, but unsuccessfully, through "integration". But now, according to experts, we are on the threshold of a new paradigm in which educational psychology has played a leading role, that of *Inclusive Education*, which sets out to eliminate the negative effects of segregation and overcome the limitations of integration. But although the spirit of inclusive education was already inspiring a great deal of educational practice, it was not until the Salamanca Declaration, made at the "World Conference on Special Needs Education: Access and Quality" (7th-10th June, 1994) and endorsed by the representatives of 92 governments and 25 international organizations, that this new inclusive paradigm became thoroughly accepted. The declaration asserts "the right of every child to education", and advocates the development of inclusive schools, which "are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all".

UNESCO (2008) defines it as "an ongoing process aimed at offering quality education for all while respecting diversity and the different needs and abilities, characteristics and learning expectations of students and communities, eliminating all forms of discrimination". So far, however, it is not very clear exactly what constitutes it; it is more a desire than a reality, and so many types of inclusive education can be found in different countries that it is necessary – indeed urgent – to precisely define its boundaries so as to avoid possible confusion and to successfully organize educational practice. The confusion found internationally arises, at least in part, from the wide range of definitions of inclusiveness.

Attempting to discover the meaning of the UNESCO definition, we might consider some keys to its explanation (Beltrán, 2011). First of all, it stresses the nature of inclusive education as an *ongoing process*. Thus, it excludes the idea of it as a state, and highlights its process-based, dynamic and open-ended character. Second, its aim is to offer *quality education for all*, and this reflects the essence of the inclusive education concept, in denoting its two major objectives: quality, and quality for all. A third key aspect is *respect for diversity*. The message here is that diversity is not something "bad" or dangerous; on the contrary, diversity should be respected, and above all, it is compatible with educational quality, so that there is no need to separate pupils because they are different. It is perhaps this third key aspect that best expresses the spirit of the UNESCO declaration, and that

crucially distinguishes this paradigm from previous educational models. Diversity thus passes from being an enemy of quality education to become an essential ingredient of it. The fourth key aspect is the emphasis it places on *respect for individual differences*, whether these refer to learning needs, abilities, characteristics or expectations. And finally, the UNESCO definition recommends *the elimination of all forms of discrimination*. There are, of course, many types of barriers that can give rise to such discrimination. But it is precisely the school which, through its interventions, can reduce barriers to learning and promote the success of all pupils. It is highly significant that the expression *learning difficulties* is substituted by *barriers to learning*, reflecting the change from a situation in which potential academic failure is explained in individual terms to one in which it is explained in social terms.

As far as the organization of educational practice is concerned, research has identified some models of reference for inclusive education, the most important being, in our view: a) *cooperative learning*; b) *learning strategies club*; c) *heterogeneous grouping*; and d) *learning community*. Nor should we overlook the potential of technology as a source of inclusiveness. In this regard, there have been a number of relevant initiatives, including, in the Spanish context, a project related to the learning model CAIT (*constructivo, auto-regulado, interactivo y tecnológico*, or constructive, self-regulated, interactive and technological) (Beltrán & Pérez 2005) and the BIT Project, specifically for individuals with mental impairment (Pérez, 2002; Pérez & Beltrán, 2007).

In reality, inclusive education is not a generous, humanitarian solution for resolving cases of students with deficits. It is a *process* of educational reform with extraordinary potential for change. But it is also a visible *outcome*. It is in fact the result of a long historical process in educational psychology, linking a series of beacons that indicate the distance travelled from *normalization* to *the recognition of human rights*, from *special education* to *regular education*, from *curricular differentiation* to the *common curriculum*, from the *absence of a few* to the *presence of all*, from the *responsibility of specialists* to the *shared responsibility of all teachers*, from the *pupil* to the *community*, from *integration* to *inclusion*. The extent of this journey can only be appreciated when we see that the point of reference, that is, the unit of analysis of education, is no longer in national institutions, as in the first paradigm, or in regional administrations, or in the teacher, or in the pupil, as in subsequent models. Today the true unit of analysis for education is the *learning community* in which all pupils learn to live through a shared project.

In sum, educational psychology has made three great contributions to teaching: 1) it has converted it into a genuine science, freeing it from the influence of mere opinions, personal notions or pedagogical routines; 2) it has progressively improved its perspective: from associationist, to behavioural, and finally to a cognitive approach – that which currently prevails; and 3) the cognitive perspective on teaching, driven by educational psychology, has shifted the centre of gravity of teaching, giving rise to new paradigms, centred first on the teacher and then on the pupil, to arrive today at a new and challenging paradigm, that of inclusive education, which places the emphasis on the learning community.

Learning

Learning is the "star topic" of educational psychology and, at the same time, this discipline's most important contribution to education, especially with regard to school practices. As Mayer (1996, 2001) suggests, the most visible and lasting outcome of educational psychology is the development of educationally relevant theories about learning and knowledge. This was, indeed, Thorndike's dream, whereby teachers would select their methods according to the results of scientific research, rather than being guided by routine or general opinion. Seeking a robust theory of learning, educational psychology generated a number of them, from the connexionism of Thorndike, who was one of the twentieth century's most influential theorists of learning – making crucial contributions and discovering laws and principles that today belong to the universal repertoire – to Hull's (1943) mathematical learning theory, to Skinner's (1953) behaviourism and to the cognitive theories that culminate in self-regulated learning.

The arrival of cognitive psychology in the field of learning was led by the work, within educational psychology, of authors such as Ausubel (1965), with significant learning, Bruner (1960, 1966), with discovery learning, and Carroll (1963), with scientific models of school-based learning. Bloom (1956) and Gagné (1970) set out to develop the sequence of learning, identifying its processes and conditions of effectiveness, thus highlighting the active participation of students, who, far from being driven by the stimulus to emit a response, as

the associationists thought, are actually the true protagonists of the process, since they categorize, process and interpret the informational content of the stimulus before giving the corresponding response. The new cognitive theories focus, then, on what students do whilst they learn – that is, how they handle and transform the information received, and above all, how they relate it to previously-incorporated experiences.

Clearly, this change of perspective on learning represented a Copernican shift in the conception of teaching and the role played in it by the teacher. Teaching revolved around the student more than the material, and aimed to facilitate the construction of meaning in the student, placing emphasis on the interaction between the student's mental structures and the information received. A fundamental task of teaching would therefore be to adapt the material and the corresponding instructional methods to the particular characteristics of each learner. Thus, there began to emerge numerous models of instructional design. A good critical review of 40 models of instructional design is that by Andrews and Goodson (1979).

As pointed out earlier, although one of the original goals of psychology in the mid-twentieth century was the development of a general theory of learning, it soon became clear that psychology's quest for a general theory of learning had failed, and the grand theories of learning gradually began to fade away. Education offered psychology the possibility to understand how people learn in real content areas in the classroom, and educational psychology, having rescued psychology from a fruitless quest, began developing specific theories adapted to curricular areas – how to learn to read, how to learn mathematics or how to learn history (Mayer (2001).

Another area that benefited from this restriction of the study of learning is that of learning strategies, both cognitive and metacognitive. Belmont and Butterfield (1971) found that students in special education performed less well than students in regular education in learning a list of letters. Moreover, special education students did not spontaneously employ strategies of repetition (repeating the list aloud), whilst the regular education students did use such strategies. However, when the special education students were taught to use repetition, their performance in recalling the list improved to the level of the other students. The study of learning strategies has had numerous representatives here in Spain and elsewhere (Beltrán 1993, 1996; Beltrán, Pérez, & Ortega, 2006; Cabanach et al., 2008; Cano & Justicia, 1994; González-Pienda et al., 2002a; Pintrich & Johnson, 1990; Pressley, 1988; Román, 1990; Santiuste, 1998, 2003; Valle et al., 2007; Weinstein & Mayer, 1986). Thanks to the promotion of these strategies, all students, and most interestingly those in special education, have found in them an extremely effective instrument for boosting their learning capacity, which has given rise to an authentic explosion of intervention programmes with very high levels of efficacy. In the same direction and for the same reason, there has been an increase in research on reading comprehension strategies. Brown and Palincsar (1989) showed that it is possible to teach students with problems how to use reading comprehension strategies involving aspects such as asking questions, clarifying, summarizing or predicting.

One of the key events in the development of strategies took place nearly forty years ago, when McKeachie (1974), a specialist in instructional and learning problems, wrote one of the first reviews in this area in the *Annual Review of Psychology*, entitled "Instructional Psychology", and which dealt with the advances being made in this new science thanks to research efforts in cognitive psychology. Twelve years later, in a new review, his predictions had come true (Pintrich et al., 1986). The orientation of learning was clearly cognitive and, above all, the core of research was so focused on the analysis of what began to be called "learning strategies" that the following year McKeachie (1987) wrote an article with the expressive title "The new look in Instructional Psychology: teaching strategies for learning and thinking"; and these strategies indeed represent just that, the "new look", or new perspective in the psychology of instruction (Beltrán, 1996). Two other specialists in strategies, Pressley and Levin (1989), using the metaphor of the computer, talked about strategies as the "software" or package of programs stored in the memory, as distinct from the "hardware" or structures of the system, highlighting the attention being paid in recent years to the study of software.

As the experts point out, learning strategies constitute one of the core topics for researchers and, in general, for all those involved in educational intervention. One has only to glance at scientific journals, international conferences, other specialist publications or university curricula to see how much progress and development has occurred in the last few decades, usually with the same result: the positive effect of such strategies on academic

performance (Beltrán, 1993). The relation between strategies and performance is easily explained if we consider that if learning strategies are the ideal tools for constructing knowledge, the higher the quality of the strategies and the more numerous they are, the better the student's performance will be.

Even more evidence comes from educational practice. As any teacher knows, successful students and students who perform poorly or fail use different strategies, as occurs in the case of experts and beginners in other areas. Hence, in classroom situations, teachers have long since put poorly-performing students together with good students so that, observing them, the former can also learn to study, that is, to correctly use the thinking tools that strategies represent (Pérez, González, & Beltrán, 2009). But there is also empirical evidence to corroborate such data from practical contexts. In the ERIC database alone, between 1982 and 1992, 1,415 articles on learning strategies were published, and nearly a dozen meta-analyses on the results of interventions for improving the learning strategies of students with poor academic performance (Hattie, 2009; Hattie, Biggs, & Purdie, 1996).

Today there is a general consensus, derived from research, on the existence of a close correlation between strategies and performance. The results indicate a correlation of between 0.20 and 0.30, leading to the conclusion that learning strategies would explain around 4-9% of variance in performance (Miñano & Castejón, 2008). In the case of strategies of an affective-motivational nature, the correlation increases to 0.40, explaining 16% of variance in performance and giving it an important role in the prediction of performance (Pintrich & Johnson, 1990).

Another indicator, which reflects an even closer relation between strategies and learning, is effect size. The thousands of studies analyzed by Hattie (2009) on the effect size of intervention programmes in learning strategies for improving performance, carried out over more than 30 years, attribute to cognitive strategies a size of 0.59, and to metacognitive strategies of 0.69. The marker of reference for confirming a positive effect of these interventions is 0.4. Below this value, the intervention was not positive; above it, it was. The strategic markers found (0.59 for cognitive strategies and 0.69 for metacognitive) are highly positive. This means an approximate correlation between the two variables (strategies and performance) of 0.24 in the case of cognitive strategies and of 0.33 in that of metacognitive strategies.

In a recent study, Kim et al. (2008) summarized the intervention studies (a total of 50) carried out in South Korea between 1990 and 2006, using meta-analysis. Cognitive strategies had an effect (in this case indicated by Cohen values) of 0.82-1.69 for cognitive strategies and of 0.82-1.42 for metacognitive strategies. Even more recent research (Muelas, 2011) has demonstrated the relevance of learning strategies on revealing that it is the only variable of all those studied (intelligence, personality, self-concept, etc.) that has predictive value with respect to academic performance.

Educational psychology has continued to make progress in its efforts to contribute to the improvement of educational practice, not so much to construct a new general theory of learning as to identify, within the cognitive field, the internal events that occur in students' minds while they learn, from the moment when they are presented with the content until the construction of meaning is achieved. This has taken many years of work within educational psychology, involving a long list of experts (Beltrán, 1993; Gagné, 1974; Goñi, 1998; Shuell, 1988; Thomas & Rohwer, 1986).

Thus, learning is now understood by all as the outcome or effect of the thinking elicited by the material presented at the beginning of the teaching-learning process. To identify the components of this learning process is therefore nothing less than to identify the different movements, phases or functions of thinking that take place when one learns. Teaching, which means helping people to learn, would be equivalent to teaching how to think, that is, helping people to develop the different functions of thought and not simply helping them to store content. Hence the importance of the teacher as mediator and not as mere transmitter, and of the assessment of processes more than of products (Beltrán, 1993; Coll, Palacios, & Marchesi, 1990; Fernández, 1996; Rivas, 1997).

Mayer (2001) illustrates the nature of learning with three metaphors that help us to understand and differentiate this process: learning as acquisition of responses, as acquisition of knowledge and as construction of meanings. This triple metaphor marks out the history of learning over a century under the guidance of educational psychology. It is no longer a question of acquiring responses and storing them in the memory to reproduce them later in a purely mechanical way. And nor is it a case of accumulating knowledge in encyclopaedic fashion

to satisfy inveterate demands of erudition. It is more a question of learning to learn, of learning to be intelligent and construct meanings.

Consequently, if we consider learning as the construction of meanings, the role of students in this model is that of autonomous, self-regulated learners who know their own cognitive processes and have control over their own learning. Self-regulated learning thus represents the latest stage of educational psychology's development in relation to learning. To go deeper into the nature of this learning model, to identify the process that constitute it, to discover the variables that make it possible from the perspective of the student and from that of the educational context, and to identify the conditions for its effectiveness and its instructional organization – these are some of the aspects being addressed today in the area of educational psychology (Bandura, 1993; Boekaerts, Pintrich, & Zeiner, 2000; Núñez et al. 2006). Knowledge of self-regulated learning has benefited from the publication of the *Learner-centred psychological principles* (APA, 1995), which repeatedly highlight the presence of metacognitive processes in learning.

However, the privileged place occupied by strategies in the new architecture of learning promoted by cognitive psychology came to divert attention from the influence of other variables, such as attitudes, beliefs, dispositions and, above all, motivation. And to such an extent that this bias began to form part of a certain culture, especially in the West, according to which, when children fail, the customary explanation is a lack of ability, and when children obtain good results, they are attributed to high ability, regardless of the efforts they have made to achieve them. This, indeed, is still a deeply entrenched theory today: what counts in learning is intelligence.

It is necessary, then, as Perkins (1992) rightly points out, to "dethrone" strategies, to pull them down from the pedestal on which they have been placed and to take into account, in explanations of learning, other variables that are equally determinant but dispositional. In fact, Sternberg's (1985b) recommendation to go "Beyond IQ" soon began to make an impact within the academic community. Learning ability counts for nothing, of course, if the individual does not find sufficient motive for engaging it. And here we have the perennial dialectic between two worlds: between being able to and wanting to, between "skill and will".

Given the awareness of this imbalance between ability and motivation, there have been efforts to correct it, and to supplant it with the idea of *interaction* between cognitive and motivational variables (Ausubel, 1965; Barca et al., 2009). Clearly, depending on their personal motivations, individuals will choose one type of learning strategy or another, so that the result can be mere mechanical repetition of the information (if superficial and purely mechanistic strategies are used) or genuine personal construction of meanings (if higher-order strategies are used).

To what extent has educational psychology contributed to understanding and improving students' learning motivation in this new interactive context? To do justice by the efforts of educational psychologists in the field of motivation, we should acknowledge that few educational topics have attained such high levels in terms of quantity, quality and originality as that of learning motivation. The road has not been a straight one – with its ups and downs and even errors –, but educational psychology has fought, and won, a series of battles with practically irreversible results, making a striking impact in the academic field.

First of all, it has won the battle of measurement. Clearly, it is not enough to point out that motivation is one of the great determinants of human behaviour, and consider that as a satisfactory response to the eternal questions about the subject (why we suffer, why we struggle, why we hate, why we love); or in the specific case of school learning, we cannot simply tell teachers that motivation is important for learning. Educational psychology has succeeded in measuring the strength and relevant weight of motivation with respect to learning, and particularly with respect to academic performance (Beltrán, 1993; Dweck, 1986; González-Pienda, 1996; Miñano & Castejón, 2008). For example, a well-grounded approach to the weight of motivation in learning is that of Hattie (2009), who has indicated the impact of motivation in learning in terms of "*d*", 0.48, which situates it in a privileged place among the 25 most powerful variables of academic performance.

The second battle has been that of studying the different types of motivation and their different advantages and disadvantages. In this case there has been a veritable cascade of studies highlighting the advantages of intrinsic motivation – and its different variables – over extrinsic motivation (Amabile, 1993, 1998; Cameron & Pierce, 1994; Covington, 2000; Deci, 1975; Lepper, Henderlong, & Iyengar, 2005). Indeed, research has pointed out the negative, harmful effects of extrinsic motivation since, as well as satiating the learner and thus

being superfluous, in some cases it reduced the intrinsic motivation due to so-called dual justification of the behaviour: on the one hand, the behaviour would be justified because in itself it interests and satisfies the individual, and on the other, it would be justified through external reinforcement, because it adds an incentive that interests the person. After decades of study, however, specialists are agreed that the two types of motivation are not incompatible (Eisenberg & Cameron 1996) – that they can be reconciled and even support one another, as Allport (1961) had already acknowledged with his concept of the functional autonomy of motives.

The third battle has involved motivational improvement. This is a perennial topic in educational psychology, and the efforts to address it have given rise to a long list of well-designed programmes (Beltrán, 1984; Cabanach et al., 2007), both from the perspective of extrinsic motivation, via reinforcement (positive reinforcement, negative reinforcement, modelling, token economy, shaping, programmed instruction, self-control, psychological contracts, etc.) or behavioural suppression (extinction, reinforcement of incompatible behaviour, relaxation, response cost, self-instruction, punishment, etc.), and from that of intrinsic motivation, bringing into play variables such as conceptual conflict, curiosity, cognitive dissonance, effort, the meaningfulness of tasks, self-control or self-efficacy.

The final battle, within the context of self-regulated learning, involves an educational scenario that revolves around the motivational orientation of the learner him or herself. That is, it no longer makes sense to argue about the ideal goal of learning, since there is a general consensus that individuals can have different goals when they attempt to learn, and that the challenge for education is how to help students choose their most appropriate motivational profile (González-Pienda, 2002b; Núñez et al., 2009; Valle at al., 2003).

Of course, in order to learn it is necessary to use intelligence. Therefore, within a section on learning, mention must be made of the consideration of intelligence and the impact of educational psychology on it, which has been considerable. First of all, it has tried to *clarify its concept and definition*. Probably the most famous study on the definitions of intelligence carried out by experts was that which appeared in the *Journal of Educational Psychology* (Intelligence and its measurement, 1921). The most important definitions were those shown in Table 2.

Seventy-five years later (Sternberg & Detterman, 1986), 24 experts in the field of intelligence were invited to define intelligence. Sternberg and Berg (1986) have summarized the similarities and differences between the groups of experts from 1921 and from 1986. First, there was some degree of general consensus between the two groups as regards the nature of intelligence. The correlation between frequencies of behaviours indicated was 0.50, indicating a moderate overlap in the conceptions between the two groups. Ideas such as adaptation to the environment, basic mental processes and higher-order thinking (problem-solving, reasoning, decision-making) were highlighted by both. Second, certain topics were prominent in both cases: problems concerning one or many intelligences (without a consensus being reached), breadth or restriction in the definitions (biological or cognitive elements), etc. And third, there were notable differences: metacognition appeared in '86, but had not even been mentioned in '21, and nor had aspects such as the role of context or of culture in the development of intelligence.

This diversity of definitions has been interpreted as a lack of consensus on the part of psychologists, and even worse, as a sign that psychology lacks a clear idea of what constitutes intelligence. In order to refute these pessimistic and false ideas it would be sufficient to analyze the results of Snyderman and Rothman's (1988) study, which presents the responses of over 600 experts in the field of psychology: 99.3% agreed, with regard to intelligence, on the importance of abstract thinking and reasoning; 97.7% agreed on the ability to solve problems; and 96% were in agreement on capacity for acquiring knowledge. This effectively rules out the notion of disagreement. Moreover, these definitions are in line with common-sense perceptions, whereby people are called intelligent when they can reason, think in abstract terms, solve mental problems and learn.

Why, then, is there thought to be disagreement? As Eysenck (2000) points out, psychologists describe the innumerable and highly diverse things a high IQ permits us to do. But the fact that authors focus on one or another does not imply disagreement on the nature of intelligence. Physicists study the different consequences of gravity: the apple falling on Newton's head, the movements of the planets, the mechanisms of galaxies, and so on. And this does not mean that physicists are in disaccord about the fundamental law of gravity. Likewise, a great variety of consequences arise from the assertion that there is a general intelligence, but that does mean there is

disagreement on its nature. It is not necessary to have total agreement on something in order to have a meaningful concept of it.

Educational psychology has also *provided a measure* of what we call intelligence. The main contribution of Binet (1905) was to present the first known measure of intelligence. Together with Simon he published the first intelligence scale, having been commissioned to do so by the French Ministry of Education, with a view to identifying those students who needed special help to get through the school curriculum, and to situating them where they could be taught most appropriately. Subsequently, many more scales have been contributed by educational psychology, and with progressively better levels of validity and reliability.

Thirdly, the discipline *has furnished implicit and explicit theories of intelligence*. Implicit theories refer to lay persons' views of intelligence. They are important because, as well as providing a basis for the development of explicit theories, they aid an understanding of people's educational tendencies and perspectives and explain the way in which people evaluate their own intelligence and that of others. In these two latter cases, educational psychology has been of great service to education (Neisser, 1979; Shipstone & Burt, 1973; Sternberg, 1985a, 2000).

With regard to educational perspectives, Sternberg et al. (1981) (Sternberg, 2000) identified three theories: platonic, democratic and egalitarian. The platonic view is that people are born with different levels of intelligence, and that the less intelligent need to be looked after by the more intelligent in order to function in life. From this it is deduced that the goal of education is to create an intellectual elite, because the less intelligent are incapable of organizing progress and would bring about chaos. The democratic view says that all human beings are equal in terms of political and social rights, and should have equal opportunities. The goal of education is not to create an elite, as in the previous case, but rather to offer all children the necessary opportunities to use the abilities they have. According to the egalitarian view of intelligence, all human beings are equal, not just as humans, but also in terms of their competencies. On this view, then, people are essentially interchangeable in any human activity except those requiring special skills that can be learned. If we know a person's implicit ideas about intelligence, we will be able to know better their educational perspectives and tendencies.

In relation to the help provided by implicit theories for understanding the way in which we estimate our own intelligence and that of others, educational psychology has carried out, over recent decades, numerous studies for explaining the effects and mechanisms of feminine stereotypes about intelligence.

It was Hogan (1978) who began research on estimates of intelligence, looking at whether men and women perceive themselves as having different intelligence levels, and more particularly, whether they estimate different IQ levels in men and women. Hogan analyzed 11 consecutive studies between 1973 and 1976 in which data were collected from secondary-school and university students and non-student adults. The results made it possible to draw three conclusions: a) women invariably underestimated their IQ; b) women attributed higher IQ scores to others than to themselves; and c) men and women attributed higher IQs to their fathers than to their mothers and perceived their fathers as having higher IQs than themselves. According to Hogan, male-female differences in IQ estimation are not large in absolute terms, but reveal a consistent and socially reinforced tendency to deny intellectual equality between men and women. Current social research follows the guidelines set down by Bennett (1996), and also by Furnham, who used the new models of intelligence such as those of Gardner (1983) and Sternberg (1985b). Such research has enriched this field of study over the last 20 years or so, providing exciting formats, hypotheses and explanations (Furnham, 2000; Furnham & Chamorro-Premuzic, 2005; Furnham & Rawles, 1995; Pérez, González, & Beltrán, 2010).

Educational psychology has also provided explicit theories about the nature and number of intelligences: whether intelligence is inherited or acquired, and whether

TABLE 2
DEFINITIONS OF INTELLIGENCE

- ✔ The power of good responses from the point of view of truth or fact (Thorndike).
- ✔ The ability to carry on abstract thinking (Terman).
- ✔ The capacity to inhibit an instinctive adjustment in the light of imaginably experienced trial and error, and the volitional capacity to realize the modified instinctive adjustment into overt behaviour to the advantage of the individual as a social animal (Thurstone).
- ✔ The ability to adapt oneself adequately to relatively new situations in life (Pinter).
- ✔ Having learned, or having the ability to learn to adjust oneself to the environment (Colvin).
- ✔ The capacity to learn or to profit by experience (Dearborn).

it is a unitary phenomenon or there are many types. These theories are presented in six books which might be considered the most important of the last 30 years, and which have revolutionized our view of intelligence.

The first of these works, "Frames of Mind" (Gardner, 1983), goes well beyond the monolithic view of intelligence and adopts a heterodox, pluralist view that describes cognitive ability in terms of a set of perfectly defined intelligences, whereby there would be many ways of being intelligent (at least nine), each person has all nine, and the majority of people can develop each type of intelligence to an adequate level of competence. Moreover, in contrast to other psychologists who argue for a single, stable and unmodifiable intelligence from birth, Gardner conceives intelligence as a function of the experiences an individual can have over the course of his or her life. For him, intelligence is the result of the interaction between biological and environmental factors, and hence teachable. Gardner diverges from orthodox views not only as regards a unitary intelligence, but also in relation to the measurement of intelligence through tests, and on breaking with orthodoxy he makes his most important assertion: that human beings are better defined as having a series of relatively independent intelligences than by having a single intelligence indicated by IQ.

With his book "Beyond IQ", Sternberg (1985b) restructured the different dimensions of intelligence, insofar as his Triarchic Theory involves three forms of being intelligent: analytic intelligence, creative-synthetic intelligence and practical-contextual intelligence. Analytic intelligence relates intelligence with the individual's internal world, and specifies the mental mechanisms that lead to more or less intelligent behaviour: components of knowledge acquisition, transfer and execution and metacomponents that direct the components and are responsible for planning the person's behaviour. Creative-synthetic intelligence (also called experiential) relates intelligence with a relatively new task or with the automatization of the task in a particular situation. Practical-contextual (or applied) intelligence relates intelligence with the external environment, specifying three mechanisms: adaptation to the context, selection of a context better than that found, and transformation of the context according to one's own abilities, interests and values.

In contrast to the previous theories, "The Bell Curve" (Herrnstein & Murray, 1994) opened up the debate on the nature of intelligence and the number of different types of it, giving rise to a veritable academic and social earthquake. According to the theory of these authors, intelligence is a single capacity distributed among the population in the form of a normal curve – a bell curve – and largely hereditary; they asserted, moreover, that a large part of our society's ills are due to the behaviours and capacities of people with relatively low intelligence. This theory sent shockwaves throughout the world of education, and contributed indirectly to knowledge about the nature of intelligence, because it denies the possibility of improving the intelligence of students in the lower part of the bell curve, and because it rejects the effectiveness of programmes designed to improve the abilities of individuals with special educational needs.

The psychology community felt obliged to come out in force, and published a statement in the *Wall Street Journal* (1994) highlighting what is known about intelligence, in the form of 25 basic points or conclusions. As a complement to this, a group of psychologists from the APA drew up another document (Neisser, 1996), whose final summary sets out 7 as-yet-unanswered questions. Nearly 20 years later the issue remains open, to the extent that Sternberg's response to Murray's article on "Intelligence in the Classroom", which appeared in the *Wall Street Journal* in 2007, remains unpublished.

Emotional intelligence has also emerged in the context of educational psychology. It was first proposed by Salovey and Mayer (1990) in a memorable article demonstrating that emotional intelligence met the conditions for being considered as intelligence. Indeed, it had been identified previously by Gardner, within the set of multiple intelligences, as intra and interpersonal intelligence. But it was Goleman's (1995) book – Emotional Intelligence – that did most to popularize the concept, and has a best-seller in the social science field.

Nisbett (2009), in his book "Intelligence and How to Get It", endorsed, from his own experience of learning difficulties with mathematics (due to his absence from school because of a transitory illness in childhood), the efficacy of school resources, demonstrating with abundant statistical data the influence of school, and adopting an environmental conception of intelligence. The author's parents had in fact interpreted their son's poor performance not as a lack of previous knowledge due to his absence from maths classes, but as a demonstration that mathematical ability is something one has or one doesn't have, regardless of one's efforts; they even invoked the argument that there had never been any

distinguished mathematicians in the family. Many, if not most experts in intelligence in the last century believed that intelligence and academic ability were largely hereditary, promoted and more or less enveloped by some reasonably normal environment.

Dweck's (2006) "Mindset" represents one of the most interesting recent contributions to research on intelligence and educational practice in the area of personal beliefs. According to this author (2006), there are people who believe that intelligence is a static and fixed entity; that one is either intelligent or one is not. Intelligence, therefore, cannot be modified, whatever we do. Others, in contrast, believe that intelligence is dynamic, and can grow and improve. Personal effort can contribute to this. Those who believe intelligence to be fixed and static are only interested in demonstrating that they are intelligent, so that they avoid challenges, envy others' success and loathe criticism. Those who believe that intelligence is dynamic, and can develop and grow, are not afraid of mistakes or of failure, because through effort they can be remedied. Recognition of the power of beliefs is what has promoted the climate of "Yes, we can!" that has pervaded politics, sport and so many other aspects of life worldwide in recent years. In order to do something, it is not enough to be capable: we must also believe in our own ability to do it. The new environmentalism seems to be winning the battle (Hernández, 2002).

But genetic factors also count. As expert reports show (Neisser,1996), genetic endowment contributes substantially to individual differences in intelligence, but the mechanisms through which genes exert their effects is still unknown. The impact of genetic differences appears to increase with age, but we do not yet know why. Likewise, environmental factors also contribute significantly to the development of intelligence, but it is not clear what those factors are and how they work. School attendance, for example, is important, but we do not know which aspects of school are critical. And they must be identified. A recent study (Taylor et al., 2010) published in *Science* highlighted the importance of teacher quality for students' performance. The authors of the study began by stating that influence of the quality of the teacher, as a specific factor within the school environment, is unknown. But in their study, carried out with twins in the first two years of primary school, they found that when all the teachers are excellent, the variability in reading performance seems to be largely due to genetic mechanisms. However, if the teaching quality is poor, it moderates the effect of the genes and prevents children from reaching the full potential of their ability. These results have had unquestionable educational impact.

Can intelligence be improved? In truth, save those who think human potential is based solely on genes – in which case it is not possible to modify it through education – all educators think that educational systems can improve the intelligence of their students. But the response must be of an empirical nature. In this regard, the first rigorous study was carried out by Whimbey and Whimbey (1976), who reviewed different attempts to increase students' IQ. Among all the studies reviewed, one which stood out was that of Bereiter and Engelman (1966) with preschoolers. The training programme covered 15 basic abilities or competencies, the child/teacher ratio was 5 to 1, and its duration was two hours, divided into 20-minute sessions. The results are considered highly positive.

Some of the most well-known and widely-used programmes have been: the Instrumental Enrichment Program (Feuerstein 1980), Project Intelligence, carried out in Venezuela (Herrnstein et al., 1986), Practical Intelligence for Schools (PIFS), by Sternberg and Gardner (Spanish version: Pérez, Beltrán, Prieto, Muñoz, & Garrido, 1990) and Project Spectrum (Gardner, Feldman, & Krechevsky, 2008). In the wake of Feuerstein's programme designed to improve the intellectual conditions of exiled Israeli children, there has been an avalanche of initiatives aimed at improving students' thinking, based on confidence in the modifiability of intelligence. This has also constituted an excellent contribution of educational psychology to education (Hernández, 2005; Nickerson, Perkins, & Smith 1985). Although the results have not been totally consistent, we cannot overlook the positive effects of many programmes across a range of contexts and age groups. In the last 20 years or so, especially, numerous intervention programmes have been carried out with different types of students – from those with learning difficulties to high-ability learners –, and with positive results.

Nor should we give in to the temptation of thinking that the improvement of intelligence can be reduced to a simple brain training game. Today, the brain training game industry is quite powerful, and its arguments may seduce the scientifically less-qualified. A recent study by Owen et al. (2010) published in *Nature* involved 11,000 volunteers divided into three groups: the first of these did

brain training activities; the second took more general cognitive tests; and the third acted as a control group and surfed the Internet answering questions at random. All three groups performed these activities over a period of 6 weeks, at the end of which they were assessed with tests of memory, reasoning and other cognitive functions. The results revealed some improvement in performance on the tasks they were carrying out, but the three groups showed only small and similar improvements in the assessment tests, which may have been due to the well-known effect of multiple repetitions of the same activities. The author's conclusion is that playing brain training games can improve performance in the games themselves, but that this effect does not transfer to other aspects of brain function. As he rightly points out, you cannot improve your ability to play the trumpet by practicing the violin.

In sum, in the area of learning and intelligence, the contributions of educational psychology have been decisive. As regards learning, 1) it has generated general scientific theories, and later specifically school-related theories, focusing on different curricular content; 2) it has dropped the associationist and behaviourist approaches to learning so as to concentrate on the cognitive approach, identifying the different stages of information processing from the perception of the stimulus to the construction of meanings; and 3) it has highlighted the impact of cognitive and metacognitive strategies in the activation of self-regulated learning. With regard to intelligence, four contributions in particular have had great impact: a) its provision of implicit theories that help us to understand people's educational tendencies and orientations, as well as to understand some of the mechanisms by which women's stereotypes about intelligence are transmitted; b) its break with the orthodoxy of a single intelligence and its consideration of multiple intelligences; c) its provision of explicit theories that free intelligence from the centuries-old burden of its conception as an innate and unmodifiable trait, which gave way to its interpretation as something that we all have in different degrees, but that can be modified and improved through practice and exercise; d) its application of the term "intelligence" to two realities that had been conceptualized in Western culture as rivals: reason and emotion – now synthesized as emotional intelligence.

Content

The contribution of educational psychology to education can be understood and assessed systematically, considering the series of topics it has been capable of addressing over a century. The content of educational psychology extends, indeed, from the study of any phenomenon with an educational dimension to the specific content of verbal learning in the classroom. The criteria for determining the boundaries of its content might be as follows: analysis of the most prestigious authors, the most widely-used manuals and the specialist journals. Here are the conclusions emerging from an examination of the content based on these criteria.

As regards the conceptions expressed by the most well-known authors, the majority of them consider learning as the core topic. Some mention, in addition to learning, the topics of aptitudes, individual differences and development. From a review of manuals it emerges that: a) there is a lack of agreement with respect to the emphasis placed on each topic; b) the content varies from author to author; c) the content of different manuals often overlaps; d) the content is focused on learning, development and assessment; e) the treatment has evolved from a theoretical consideration to a more empirical approach.

The analysis of the most widely-used manuals carried out by Mayor (1981) yields the following percentages of pages: learning (22.57%); development (15.36%); assessment (9.35%); introductory questions (8.99%); educational situations (8.18%); intelligence and reasoning (7.24%); motivation (4.26%); and personality (4.01%).

As far as journals are concerned, the *Journal of Educational Psychology* has devoted many pages to questions of the application of psychology to education, particularly the education of teachers. It has influenced the APA publication on learner-centred principles and a series of books on psychology in schools, such as the work by Zimmerman, Bonner and Kovach (1996). This is evidence that such work is influenced by the knowledge generated through research in educational psychology, thus contributing to psychological theory and to educational practice.

Some initial results of the analysis of journals can be seen in Table 1. They are taken from O'Donnell and Levin (2001), who presented a summary of the topics that appeared in the *Journal of Educational Psychology* between 1910 and 1999. The foremost content is that dealing with intelligence and tests or instruments for its measurement, followed by learning, and then by teaching or instruction. The review considers a total of 641 articles from the journal in question. Although the list is not exhaustive, it is illustrative (see Table 3).

A pattern that emerges from a simple glance at the data, over the course of the last century, is the tendency to develop adequate measurement instruments before studying any aspect. Intellectual performance and functioning could not be studied before the development of measures of functioning; the influence of motivation could not be interpreted without reliable measures of motivation. Thus, attention to measurement appears to precede more in-depth exploration of the complexity of the phenomenon in question. New challenges emerge concerning the understanding of the role of affective influences in academic performance; new journals dealing with statistics and measurement are launched.

A review of the period 1991-1996 (Smith et al., 1998) corroborates and extends the list of topics: reading, learning, performance, assessment of student learning, human development, motivation, educational issues, mathematics and the identity of the field of educational psychology. Authors in educational psychology advocate research in the classroom; Ausubel (1965) calls for the classroom to become the new laboratory. In a partial examination of the *Journal of Educational Psychology* by Beltrán (1983) covering the years 1977-1982, the following percentages were found: learning (24.7%); intelligence and cognitive processes (24%); personal variables of performance (8.3%); instruction (14.2%); and ecological variables (5.3%).

In general terms, we can say that there is wide diversity in the topics addressed by the different authors. Not surprisingly, this has weakened the image of our discipline over time, and even threatened its survival as a science and as a professional activity. But it is also true that it constitutes an intermediate discipline between the psychological sciences and the educational sciences, and as such it has been subject to the ups and downs, insecurities and uncertainties of these two sciences, both of which are still seeking a paradigm that will give them unity and internal consistency that has so far escaped them.

But in spite of the differences found, there are also some core aspects of agreement in the data from authors, manuals and journals. There is a general consensus on the teaching-learning process as a core topic, as Sternberg (1996b) has always stressed, and on the whole context surrounding this process, which in some way guarantees the existence of a goal that characterizes and defines this discipline. However, an over-zealous broadening of its field of study could be as dangerous as a drastic reduction of its boundaries that confines psychoeducational problems to specific areas such as verbal, school-based or meaningful learning. Therefore, the best solution is to accept some thematic flexibility around the distinctive and essential core, which is the teaching-learning process. Likewise, there would seem to be a confirmed progressive tendency for an emphasis on the empirical nature of the way the content is addressed.

In sum, the study of content reveals the evolution of educational psychology, focused initially on teaching and later on learning, following almost literally the evolution of educational paradigms (instructional paradigm – personal paradigm). Thus, teaching in 1910 accounted

TABLE 3
DISTRIBUTION OF PERCENTAGES OF RESEARCH TOPICS
IN THE SELECTED VOLUMES OF THE *JOURNAL OF EDUCATIONAL PSYCHOLOGY* (1910–1999)

	1910	1920	1930	1940	1950	1960	1970	1980	1990	1999
Topics										
Intelligence tests – relation with intelligence	13.3	18.0	9.5	23.9	10.0	5.2	3.0	2.0	0.0	0.0
Tests and measurement	23.3	43.6	54.1	46.3	35.0	29.3	8.3	18.3	9.5	10.0
Learning	13.3	18.0	14.9	19.4	12.5	25.9	62.5	41.9	41.0	60.0
Teaching	30.0	2.6	2,7	3,0	7.5	12.1	1.4	11.8	3.8	3.0
Motivation	0.0	15.4	1.4	4.5	0.0	1.7	9.7	9.7	18.1	10.0
Attitude-Affect-Personality	0.0	0.0	5.4	3.0	12.5	20.7	16.7	9.7	16.2	14.0
Behaviour	0.0	0.0	0.0	0.0	5.0	3.5	0.0	3.2	1.9	30.0
Others	20.0	2.6	12.2	0.0	17.5	1.7	1.4	2,2	9.5	0.0
Number of articles	30	39	74	67	40	58	72	93	105	63000

Taken from O'Donnell and Levin (2001)

for 30% of publications, whilst by 1999 the figure had fallen to just 3%. On the other hand, learning began with a modest 13% in 1910, but by 1999 accounted for 60%. As regards content in general, the number and quality of issues covered by educational psychology today is impressive, both in the area of research and in that of classroom practice. The changes that occurred in society over this long period, the great discoveries in psychological research and, above all, the introduction of new pedagogical models and new information and communications technologies have had enormous impact on the world of content.

Context

The ecological orientation of educational psychology is the result of multiple theoretical influences and empirical verification. The theoretical influences go back a long way in time, but also derive from more recent currents such as ecological psychology (Barker, 1974) and environmental psychology (Proshansky, Ittelson, & Rivlin, 1970), which have been applied to the field of education (Bronfenbrenner, 1976), shifting research attention from the consideration of individual characteristics to the consideration of the context of school behaviour. The empirical findings indirectly result from a disenchantment with the outcomes of the traditional aptitude-treatment perspective, limited by the conceptual narrowness with which it interprets the person-environment interactive model and by the inadequate design of the consequent research strategies. Thus, school behaviour would be interpreted as a function of the individual-environment interaction, with precise definitions of both types of variable, and such behaviour would be studied in a complex natural context.

The features of this new perspective are: acknowledgement of the specificity of the environment or context of the behaviour and its interpretation by each individual. The teaching-learning process, given that students have different social origins and diverse personal characteristics and perspectives, should be understood as a psychosocial phenomenon, and students' behaviour as something simultaneously *situational* – since it takes place within a particular educational context – and *personal*, because it is the result of a decision process formulated by each individual.

Despite the positive results of the new instructional systems guided by the new learning- and learner-centred paradigm, it is not easy to cater to the values and goals of adolescents. A good solution to this problem was to transform schools into genuine learning communities, where the students could live every day those knowledges and values . Some of the initiatives inspired by these ideas have come to be considered classic cases in the field of educational psychology. For example, in the Group of Vanderbilt (1996) learning community, the perspective was based on the idea that students' abilities and motivation toward learning are shaped by many influences, including families, peers, teachers and organizations, as well as by the values and expectations of the community. Therefore, attempts to improve significantly the quality of learning should revolve around the whole community, more than around changes related to one or two instructional variables. Moreover, the potential of these changes will not be fulfilled unless such changes affect the very structure of the educational system. Hence, a type of anchored instruction is employed, that is, one based on real-life problems, using entertaining shows and adventures such as those of Jasper Woodbury.

The CSILE Project by Scardamalia, Bereiter and Lamon (1994) highlights the fact that knowledge is not only an individual achievement, something acquired, or better, constructed by the individual him/herself; on the contrary, as Vygostsky (Wertsch, 1985) points out, cognitive structures are formed first at the social level, and subsequently at the personal level. The goal is to get students to become involved in the improvement of knowledge itself, more than to improve their own minds. It is a substantive, radical change in school practice, but it represents the normal arrangement of priorities in the real world of the construction of meaning. The idea behind this project is to restructure school processes so that this becomes a normal and natural thing, and so that the students follow suit. In this instructional context the most important thing is to achieve the social construction of knowledge and cooperative learning. The school has a powerful web of information which all can enter. The database is constructed by the students. A key element in the classroom are the so-called intelligent challenges: all students can ask questions via the web; the question is not erased until its author is satisfied with the responses given.

Brown and Campione's (1996) Fostering Community of Learners (FLC) stresses the value of reciprocal teaching. But reciprocal teaching is just one component of a learning community designed for developing the abilities distributed among the students. To promote this

community, the students are converted into authentic designers of their own learning; teachers encourage the students to be partially responsible for the design of their own curriculum. In addition to reciprocal teaching, FLC uses appropriate versions of cooperative learning. Students work in groups in different areas of the curriculum. Within the groups, each student has a specific research task, preparing the teaching materials and using sophisticated technology. Hence, each student can be, within their group, a veritable specialist in the discipline in question, helping the others to become familiar with and master the material. The features that characterize this community are as follows: intelligence is distributed; there is individual responsibility to share; reciprocal teaching is used; and above all, in the community there is sowing, emigration and permanent appropriation of ideas.

There are many other communities, some examples being: the Accelerated Schools for Disadvantaged Students (Stanford University; Levin, 1987); the Comer School Development Program (Yale University; Comer, 2001); or the Center for Social Organizations of Schools (Johns Hopkins University; Slavin, 1980). In Spain there have also been some initiatives with learning communities. Notable among these is the *Aula inteligente* ("Intelligent classroom"; Segovia & Beltrán 1998).

Teaching has also been shaken to some of its most solid foundations, like many other areas of human activity, by the emergence of information and communications technologies (ICTs). The new technologies constitute a kind of power, a great, almost unlimited power. But they are nothing more than an instrument. An instrument that can shape the destiny of education. However, their instrumental power will never be able to change education by itself. The value of educational technology, like that of any instrument in the hands of man, depends not so much on the intrinsic value or effective power of the instrument as on the head of its user. The artist's brush or the surgeon's scalpel results in a work of art or saves a life when it is in the hands of an artist or an expert, and its value is measured by the artistic or therapeutic value of that person. So, what can be done? An interesting alternative would be to *redesign education*, that is, to take advantage of the new technologies to rethink or reinvent it. Businesses that have done the same in industrial society have been successful, whilst those which have been content with a simple restructuring have gone under. Thus, education is obliged, in the light of the new technologies, to reconsider a series of aspects: what it means to educate, the roles of teacher and student, the meaning of content, and above all, the new arrangement of the school context. This is the work of many educational experts who are trying to guide this technological revolution in the context of educational practice (Beltrán & Pérez, 2003; Beltrán & Vega 2003; Jonassen, 2000).

Another choice to be made, given the irruption of ICTs into the classroom, is that between education based on reproduction and that based on imagination. The education of **reproduction** consists in the presentation and teaching of knowledge and content that must then be faithfully reproduced. It is a position based on the old model of truth, which is truer the more accurately it is reproduced. The education of **imagination**, on the other hand, employs appropriate strategies for relating, combining and transforming knowledge. It corresponds to the new model of truth revolving around searching, enquiry, curiosity and imagination. The truth, in this case, is something dynamic; it is more question than answer, more process than product.

If we put ICTs at the service of a reproduction-based education, we shall not have advanced at all. However, if we put them at the service of an imagination-based education, we shall be able to take advantage of their full revolutionary capacity. Moreover, for ICTs to fulfil their enormous potential for transformation, it is not enough for them to act as just another instrument: they must be integrated into the classroom context to constitute a cognitive tool that can improve intelligence and enhance the learning adventure.

From the point of view of educational psychology, it is not a question of students "learning technology"; nor is it a question of their learning "from technology", as they previously learned from the teacher or the text, but rather, that they "learn *with* technology", it being understood as a cognitive instrument. True integration of technology and learning will arrive when students use the technology as a cognitive tool capable of extending their own mental abilities. In time, identification with the cognitive tool will have developed to such a degree as to produce a society in which students will do what they are best equipped to do (planning, deciding, assessing) and will leave to technology what it is most suited to (searching, comparing, storing).

To summarize the contributions of educational psychology in the area of context: a) it highlighted the concept of a class as a general and undifferentiated entity to which the teacher's scientifically-grounded explanation

is addressed; b) it subsequently stressed the specific needs of students; and c) it introduced the concept of the learning community supported by technology. In any case, within the educational context we have taken an irreversible step, involving a conceptual shift from "learning difficulties", an explanatory label with personal implications, to the more socially-oriented "barriers to learning".

CONCLUSIONS

In the light of what we have seen, the contributions of psychology to education are such that it is impossible to understand today's education without taking into account the tracks that educational psychology has left over these 100 years in which, with all its ups and downs, it has led the development of the educational process, while at all times staying within the confines of the scientific model, as regards both research and school practice. More specifically, and following the four vectors of education, educational psychology has not only converted *teaching* into a science, distancing it from routines based on more or less traditional or intuitive criteria and endowing it with scientifically-validated methodological tools and resources, but has also helped pilot the course of its paradigmatic evolution from initial approaches based on the teacher's abilities, to those that consider the specific needs of the student, and finally to a perspective that guarantees the rights of all as members of a society with a shared project.

Within the field of *learning*, educational psychology, after establishing that school learning is fundamentally a change, and not a mere mechanical reproduction of responses, has interpreted this change as a construction of meanings on the part of the learner, and has identified the chain of mental processes – both cognitive and metacognitive – that the learner must set in motion to achieve such construction, defined today by educational psychologists as self-regulated learning.

As far as *context* is concerned, educational psychology has successfully incorporated the new ecological currents and powerful technological instruments for changing the scenario of the classroom and converting it into a community that addresses and resolves real problems related to students' lives. As a logical consequence of the above, it is understood that the content of education has evolved driven by both the dynamic of educational psychology and the society of knowledge itself. Topics and terms such as learning community, inclusive education, metacognition or self-regulated learning are as well-known today as they were unfamiliar just a few decades ago. The breadth, variety and richness of educational content today constitute undeniable proof of the progress of education and of educational psychology's impact on it.

From a wider perspective, the influence of educational psychology on society is unquestionable. At no other time in history have key psychological concepts such as intelligence, learning, knowledge or information impregnated so many layers of social life – industrial, economic, commercial and family – so much as they do today. This is true to such an extent that, once industrial society had been established, society began taking these psychological concepts to define the life and characteristics of its citizens (society of information, society of knowledge, society of intelligence and society of learning), humanizing their milieu and providing effective responses to specific demands (intelligent car, intelligent house, intelligent policing, intelligent teaching, intelligent intervention). The current tendency is to equate intelligence with quality. This has many advantages, among them the fact that we have come to know more and more about the mechanisms through which intelligence functions, and can improve our intervention systems. But it also brings with it great responsibility, that of knowing that when an educational activity is not intelligent or appropriate, the results can be disastrous, as mentioned earlier in relation to the study of learning to read and teacher quality.

Given these many contributions of educational psychology to education and society, we might ask ourselves whether there is a specific contribution which would in some way represent all of them and constitute in itself the defining feature of its identity as a discipline. In keeping with the spirit of those who founded educational psychology, this contribution would be that of adopting a psychological perspective on the nature of the problems of life and education. This would lead educational psychologists to ask particular types of questions, to design interventions designed in accordance with previous research findings and to use scientifically validated instruments. The result would be to see education, and all its many problems and issues, through "psychological eyes", that is, tapping the deep roots of psychology as a science and maintaining a commitment to practice based on scientific evidence (Cameron, 2006).

In any case, to ensure the future prospects of educational psychology and the consolidation of the hard-won changes it has achieved, as well as those of its professionals, parents and teachers, two things are necessary. First, to invoke one of the great ideas that galvanize popular opinion and transmit to it a level of enthusiasm that endorses not only the quality of professional knowledge and skills, but also a belief in one's own capacity for intervening as a parent or a teacher. We are referring here to the mental power of our personal beliefs (Dweck's "mindset"; Dweck, 2006) and to its popular and political expression through the concept of "**Yes, we can!"**. If we do not reinforce this mindset, the old uncertainties will flood back into the field of educational psychology. And the second thing we need is to clarify the directions of change that are appropriate for education. It is not so much a case of changing education (a solemn-sounding but quite ineffective idea in the light of past experience) as of changing the learning environment of each school. Nor is it a case of changing teachers (as difficult and as illusory as changing education), but rather of getting teachers to take on different roles from those they have adopted up to now, acting more as guides than as transmitters in the difficult and complex adventure of learning (for an in-depth consideration of the training of educational psychologists, see the article by Fernández in this same issue). Albert Camus dedicated his Nobel Prize to his mother (a humble cleaning lady) and his teacher, because, as he said, "they lovingly introduced me to the world of knowledge; without them, I would never have achieved it". That should serve as a pointer for the road ahead.

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