

## Future Needs and Current Situation of Higher Education Competences in the Spanish Context

Eugenio Astigarraga Echeverría\*

<http://orcid.org/0000-0002-1153-6420>

Facultad de Humanidades y Ciencias de la Educación, Mondragon Unibertsitatea, Eskoriatza

Xavier Carrera Farran\*\*

<http://orcid.org/0000-0003-3420-4215>

Departamento de Pedagogía y Psicología, Universidad de Lleida, Lleida, España

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### Abstract

This article aims to analyze and reflect on: a) the role that competencies, as a defining component of work activity and occupation in the coming decades, have in a hyper-technological and globalized society; b) the incorporation that is being given of Competency-Based Training in Higher Education in Spain (both in Vocational Training and in University Studies) and c) the conditioning factors and challenges that Higher Education faces in the immediate future in relation to competencies. The technological factor -from robotization to artificial intelligence- together with demographic, social and economic factors confirm the importance of transversal competences in the professions of the future. Faced with this demand, it is noted that Higher Education is currently in full process of adopting competencies as the axis of training. Although the study program is already defined on the basis of competences, it is still necessary to make progress in the methodological change (through active methodologies) and of evaluation (considering the learning outcomes) so that the insertion of skills in Vocational Training and at the university is complete.

### Keywords:

Higher Education, Competences, Transversal competences, Active Methodologies, Learning Outcomes

## Necesidades a Futuro y Situación Actual de las Competencias en Educación Superior en el Contexto de España

### Resumen

Este artículo tiene como objetivo analizar y reflexionar sobre: a) el papel que las competencias -como componente definitorio de la actividad laboral y la ocupación en las próximas décadas- tienen en una sociedad hipertecnológica y globalizada; b) la incorporación que se está dando en España de la Formación Basada en Competencias en la Educación Superior (tanto en la Formación Profesional como en los estudios universitarios) y c) los condicionantes y retos que tiene ante sí la Educación Superior en el futuro más inmediato en relación a las competencias.

El factor tecnológico -desde la robotización a la inteligencia artificial- junto con factores demográficos, sociales y económicos confirman la importancia de las competencias transversales en las profesiones del futuro. Frente a esta demanda se constata que en la actualidad la Educación Superior se encuentra en pleno proceso de adopción de las competencias como eje de la formación. Mientras que los currículos ya están definidos en base a competencias se necesita aún avanzar en el cambio metodológico (a través de metodologías activas) y de evaluación (considerando los resultados de aprendizaje) para que la inserción de las competencias en la Formación Profesional y en la universidad sea completa.

**Palabras clave:**

Educación Superior, Competencias, Competencias transversales, Metodologías activas, Resultados de Aprendizaje

## Necessidades a futuro e situação atual das competências no ensino superior no contexto da Espanha

### Resumo

Este artigo tem como objetivo analisar e refletir sobre: (a) o papel que as competências -como componente decisivo da atividade do trabalho e a ocupação nas próximas décadas têm numa sociedade hipertecnológica e globalizada; (b) a incorporação que está acontecendo na Espanha da Formação Baseada em Competências no Ensino Superior (tanto na Formação Profissional quanto nos estudos universitários) e (c) os condicionantes e desafios que têm diante de si o Ensino Superior no futuro mais imediato com relação às competências. O fator tecnológico -desde a robotização até a inteligência artificial- junto com fatores demográficos, sociais e econômicos confirmam a importância das competências transversais nas profissões do futuro. Diante desta demanda constata-se que na atualidade o Ensino Superior encontra-se em pleno processo de adoção das competências como eixo da formação. Enquanto os (currículos já estão definidos com base nas competências ainda é preciso avançar na mudança metodológica (através de metodologias ativas) e de avaliação (considerando os resultados de aprendizagem) para que a inserção das competências na Formação Profissional e na universidade seja completa.

**Palavras-chaves:**

Ensino Superior, Competências, Competências transversais, Metodologias ativas, Resultados de Aprendizagem.

### Introduction

We have been promoting Competence-Based Training (CBT) for several years. Initially, the debates on this model were based on its inflexibility, its deterministic/behavioral nature, and its exclusive and restricted view towards the training for work. After that, the introduction of the so-called transversal competences and the flexibilization of the model itself redirected the attention and actions, while keeping the discussion on what competences were, as its presence in all educational stages was being encouraged.

Over the following years, the European Union sought to harmonize the different educational systems and levels based on the Qualification Frameworks, while targeting the operational aspects

of training to the Learning Outcomes. In the Spanish State, only Professional Training (PT) took this path coherently.

Nowadays, the dynamics is modified by the big technological changes and by the social and working impacts that these progressively have.

In this paper, our goal is to reflect on the present and future of competences in Higher Education. What was done is unchangeable, even though it is necessary to consider it to redirect the present towards the future we want to have. The first section approaches what is happening around us in the labor market due to the impact of technological innovation, focusing on employability and new competences for employability, which seems uncertain. In the second section, the way in which the insertion of competences in the education system was carried out is revisited, on

the basis of the reality of PT. The third section briefly shows the evolution of CBT in the university and two examples of how it is being developed in practice.

Finally, some conclusions are presented. We believe these can help us define what the most appropriate way of training in Higher Education over the next years could be.

### Which Competences for Which Future?

The word “competence” entered our educational system more than three decades ago. Initially, in our context, said word established in its own right—and without excessive controversy—in the Professional Training since the approval of the Ley de Ordenación General del Sistema Educativo (LOGSE Act) in 1990 in Spain.

At the end of the last century, the competence framework was set into the working field, from which the frame of reference for the various Professional Families that then allowed to define the different professional qualification levels was extracted, based on the Functional Analysis (OEI, 1998; Cinterfor-Chile Valora, 2012),

The incidence of all this on PT was significant, and it was more successful in some places than in others. It might be thought that some adjustments -in the cases in which its incorporation has not been as successful as could be expected- and an extension -from the past to the future- in the ones that have had a greater incidence or success could be enough. But everything suggests that it is not like this. As stated by Menéndez Velázquez (2017: 268):

The 21st century is not a continuation of the past 20th century; it is a new and very conceptually different century. We are living in an era in which everything is connected with everything. This demands new strategies and ways of thinking to face the big problems and challenges of human-kind.

For this reason, it seems necessary to start looking at what is coming, where the process is being made towards, and, because of the topic we are addressing, in particular to what is related to the worlds of working and education/training. The competence approach is likely to keep being

useful, even though it might change continuously. Before addressing this matter, we shall see how the future is being outlined from one of the main perspectives that fostered competence-based training: the working field.

Through an approximation to the future of the working world, the World Economic Forum (WEF) published in 2016 a report on the employment trends by 2020. For the elaboration of this report (WEF, 2016a), the opinions of Executives and Human Resources Chiefs were gathered. They were part of relevant companies in 15 developed and emerging countries that employed more than 13 million people in 9 industrial sectors. One of the results of this broad survey is the identification of the main demographic, socio-economic, and technological factors that are estimated to notably influence employment in the future<sup>1</sup>.

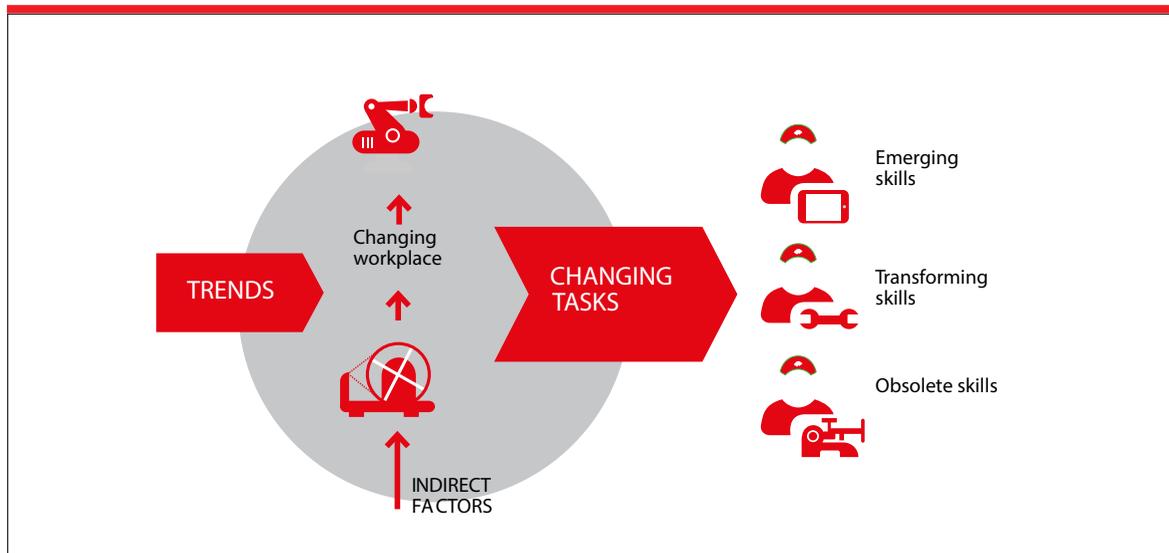
From a demographic and socio-economic point of view, the main vectors of change in the working world in the next years will be:

- The change in the working nature itself, as well as its flexibilization.
- The increase in the middle class in the emerging countries and markets.
- Climate change and the reduction/deterioration of resources.
- The increase in the global geopolitical volatility.
- New consumption patterns that take into account ethical, security, and privacy aspects.

And from a technological perspective, the five most relevant aspects that the WEF study (2016a) gathers are:

- Mobile internet associated to “cloud” computing.
- The increase in the processing capability and speed, and the Big Data.
- New energy sources.
- The Internet of things.
- The new economic and financial methods (crowdsourcing, circular economy, collaborative economy, etc.).

<sup>1</sup> Although this report focuses on the industrial sector, the characteristics of the identified factors allow to foresee that these are also going to influence other fields like fishing and agriculture, commerce, business service, tourism, etc.



**Figure 1.** Changes in Employment and the Competences Demanded by Them. Taken from Skills of the future. How to thrive in the complex new world, by E. Loshkareva et al, 2018, p. 54.

Although all of this, in a complex and interrelated manner, is going to influence education, the main aspect that will influence employments in the next years seems to be the technological aspect and, in particular, the development of artificial intelligence, which leads to the increase in automated processes, the increase in robotics, and machine “learning”.

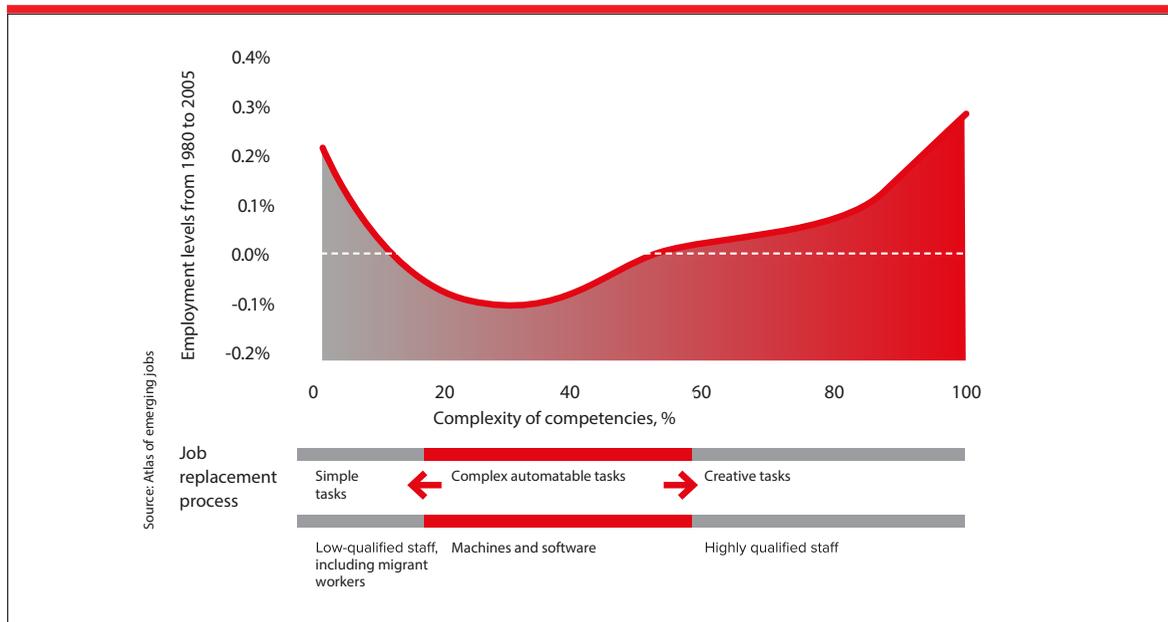
Loshkareva, Luksha, Ninenko, Smagin, and Sudakov (2018: 52) point out that “in the industry, the reduction of workers engaged in mass production will be incomparable with the increase of jobs, related to the creation and maintenance of customized products.” In this sense, we can state that the changes in employments will come from three different pathways (Figure 1):

- 1) New jobs that will generate new professions and demand new competences.
- 2) Changes in many of the occupations that we know today, which will need the transformation/evolution of the competences of the workers that put them into practice nowadays.
- 3) The extinction of some professions, which will lead to the reduction in the demand of the competencies associated to them.

Out of the three big domains implied in every human activity -cognitive, psychomotor, and

emotional-, the biggest risk of automation occurs in the psychomotor field and, to a lesser extent, in the cognitive field. However, and even though it has been traditionally believed that this field -the cognitive- had a smaller risk of automation, various works and research projects show that many of said processes (generally but not exclusively repetitive) will be prone to be performed by machines in the short-medium term. In this context, several works have tried to foresee how automation will affect employment in the following years (Arntz, Gregory & Zierahn, 2016; Elliot, 2017b; Frey & Osborne, 2013; Manyika et al., 2017).

At the same time, since the late 20th century, an increasing polarization in job offers has been observed, substantially reducing the ones requiring routine tasks that can be easily automated. According to Elliot (2017a: 20), “jobs involving non-routine tasks that cannot be yet carried out by technology occur either at the low or high end of the skill distribution, depending on whether the non-routine tasks require physical or cognitive skills.” The American economist David Autor revealed this fact through the analysis of the evolution of employment in the American industry between 1980 and 2005 based on the required competence level. As Figure 2 shows, the reduction in employments oc-



**Figure 2.** Evolution of Employment vs Competence Level (D Curve). Taken from Skills of the future. How to thrive in the complex new world, by E. Loshkareva et al., 2018, p. 56.

curs in the ones that have medium-level competence requirements.

If we delve into this topic, over the last years, there have been attempts to evaluate and understand how artificial intelligence can be a response to tasks and jobs performed by people. Various research projects have focused on evaluating the computer capability to respond to standardized tests as an attempt to infer the possibilities of machines replacing human abilities.

In this regard, Elliot (2017a) presents a research project based on the comparison between the achieved results of people in the PIAAC tests and computer capabilities nowadays. The evaluation is carried out on three competences (literacy, numeracy, and problem solving with computers) measured in said tests, allowing a first approach to the analysis of “computer capabilities with respect to one set of human skills in the context of work and education” (Elliot, 2017a: 18). Elliot adopts OECD’s definition (2012) of the three evaluated competences:

**a) Literacy** is defined as “the ability to understand, evaluate, use and engage with written texts to participate in society, to achieve one’s goals, and to develop one’s knowledge

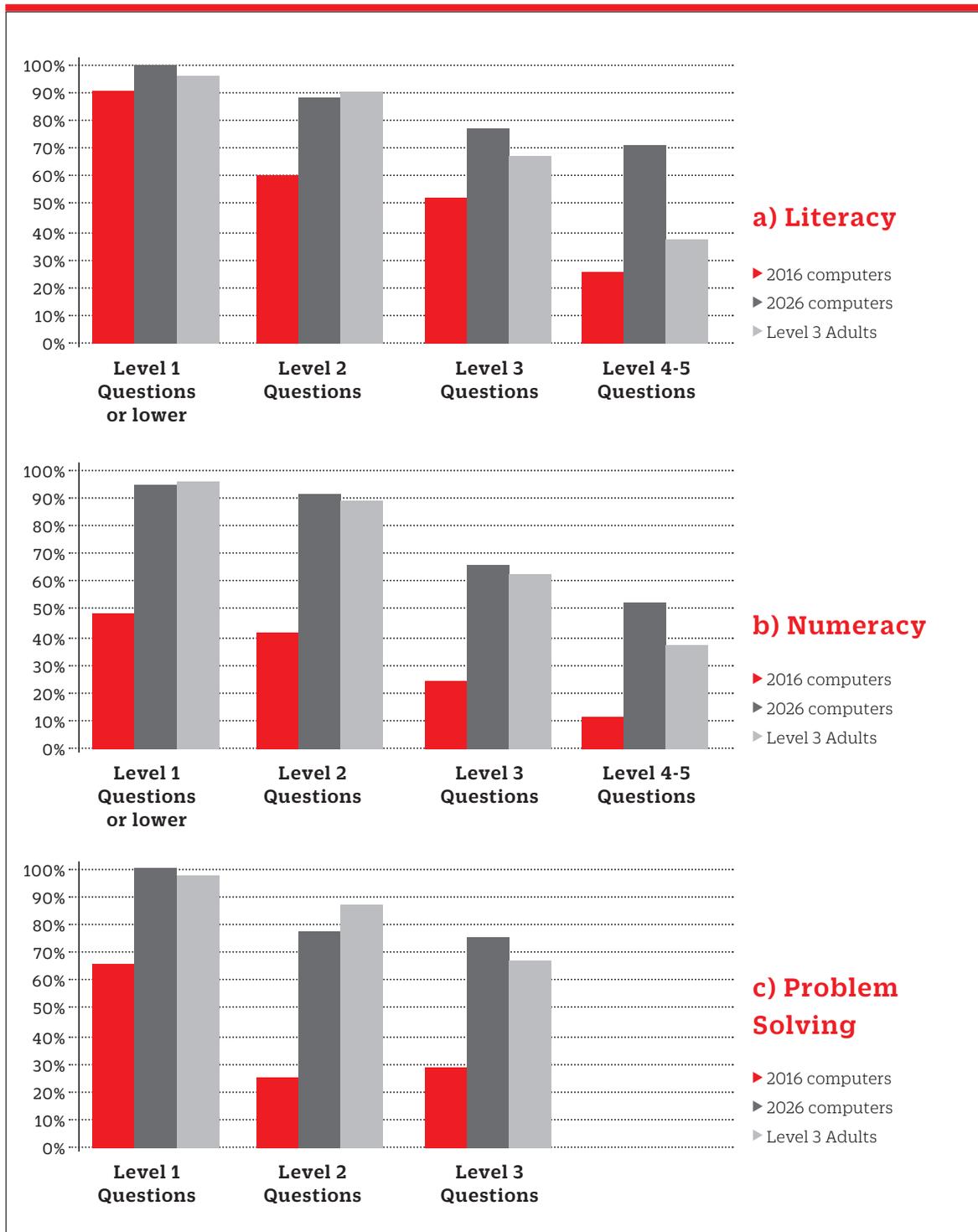
and potential” (Elliot, 2017a: 60). It is described in terms of competence levels ranging from Below Level 1 to Level 5.

**b) Numeracy** is understood as “the ability to access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life” (Elliot, 2017a: 72). It is described in terms of competence levels ranging from Below Level 1 to Level 5.

**c) Problem solving with computers** is defined as “information and communication technologies (ICTs) to acquire and evaluate information, communicate with others and perform practical tasks” (Elliot, 2017a: 81). Thus, it is not a question of focusing on digital literacy, but addressing the necessary cognitive abilities in the information era. It is described in terms of competence levels ranging from Below Level 1 to Level 3.

The obtained results suggest for each competence that:

a) The “literacy capability of computers correspond roughly to the pattern of human performance seen in Level 2 or Level 3 adults”



**Figure 3.** Comparison of scores for 2016 and 2016 sorted by the PIAAC question difficulty level. Taken from *Computers and the future of skill demand*, by S. W. Elliot, 2017a, p. 71, 80, 84. Copyright 2017 by OECD.

(Elliot, 2017a: 67).

- b) In the evaluation of numeracy, the results are particularly remarkable in Level 1, which experts relate to the presence of “images that would be difficult for a computer to interpret” (Elliot, 2017a: 73). In all the other levels, computer results in this competence (numeracy) are basically 10 points above the previous one (literacy). Therefore, with the exception of the results in Level 1 questions, it is noted that:

The comparison with human performance suggests that the numeracy capabilities of current computers correspond roughly to the pattern of performance seen in Level 2 or Level 4 adults, depending on the method used to aggregate the individual responses from the experts. (Elliot, 2017a: 77).

- c) The problem-solving competence was less thoroughly studied than the previous ones. The results in this competency are compared with reference to two performance levels of people (Levels 1 and 2), which shows that said results are relatively close the adults' performance levels with a Level 2 in problem solving with computers.

Even though it is an approximate and limited work, we observe that machines can currently perform some tasks -in the three mentioned benchmark areas- in the low-medium performance levels of people.

Some of the experts that participated in this research made their projections on the progress in the achievement level of these competences in computers for 2026. As it is shown in Figure 3, experts estimate significant progress in the three competencies -particularly in numeracy and problem solving-, especially in the intermediate difficulty levels in the various tests.

Improvements in the Artificial Intelligence and robotics field will make it possible -as it has been previously stated- for many work activities to be automated. However, at the same time -as it has happened in the previous big changes of human-kind-, new fields and working areas in which the required competences will be different are anticipated, focusing both in the human (socio-emotional) and high-level technological components,

which will lead to work with -and the control of- robots and new intelligent machines. Loshkareva et al. (2018) point out that these new working areas will emerge around cyber-economy, creative economy, the new tech, the people-oriented service, and the environment preservation and protection sectors.

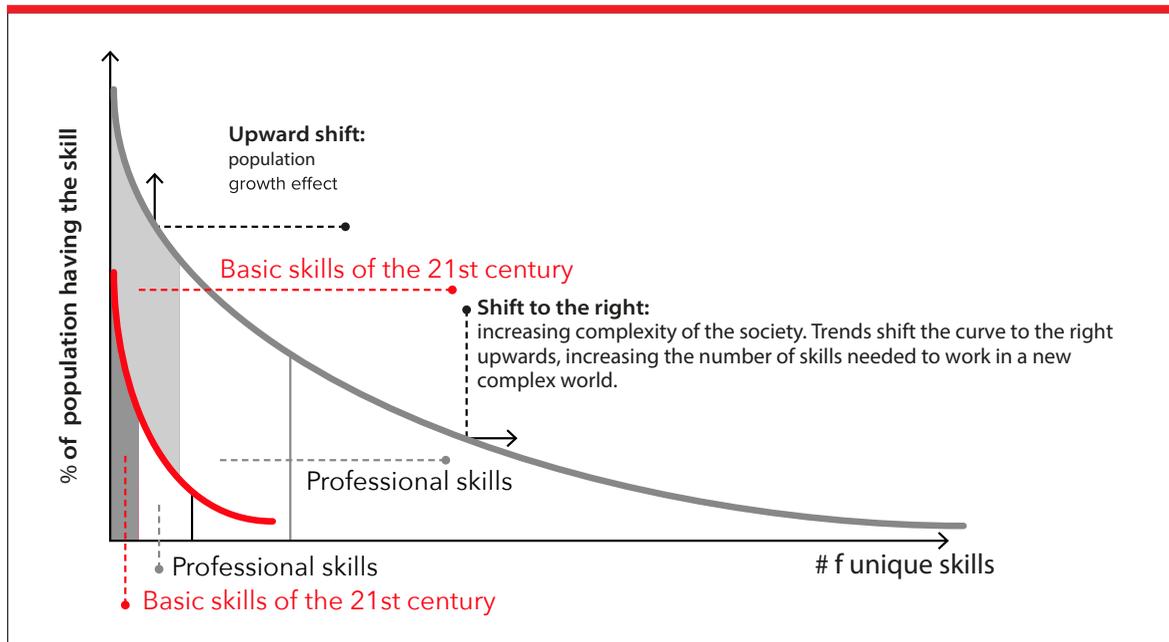
As a consequence, the technological breakthroughs -as well as other issues like climate change, the reduction of natural resources, or the increase in the global population- indicate the need to rethink the purpose and reality of work. Moreover, it is stated from some perspectives that there will be people that -according to the current meaning of work: activity through which a person receives a salary- most likely will not work in their lives.

The ones that work in the classic meaning of the word will often do it intermittently, based on projects that begin and finish in a fixed period of time. For this reason, Loshkareva et al. (2018) foresee that:

- a) It will be necessary to guarantee a minimum wage for everyone attributed to the fact of being a person;
- b) It will be necessary to extend the meaning of work to activities that benefit the community, society, and the planet as a whole.

In this sense, some of the working world characteristics that Loshkareva et al. point out (2018) are the following:

- There will not be any professions for which competences are acquired during youth that will then keep on performing the same kind of work;
- There will not be any simple jobs of executing routine operations in which what it is, where from, and where the job is executed are defined;
- There will not be a linear hierarchy, but the active participation of all workers in decision making will be necessary;
- There will not be clear limits between personal time and the work schedule, and more adaptation abilities will be needed;
- There will be new occupations that have not been named yet;
- There will be many possibilities to work in horizontal teams for projects that are oriented to common goals;



**Figure 4.** Increase in the workers' performance curve (red curve = low-complexity society; orange curve = higher-complexity society). Taken from Skills of the future. How to thrive in the complex new world, by E. Loshkareva et al., 2018, p.73.

- Permanent training throughout life will be necessary, which will often be linked to a change of activity;
- Complex systems will be used, and jobs in virtual reality and augmented reality will be common;
- Each person will need their own idea of the meaning of their activity, so work will become the manifestation of said meaning;
- Each person will be able to treat work as a space for their own development, communicating with others, and fulfilling personal goals.

To sum up, we can state that the people's performance curve will continuously broaden its application area (Figure 4), increasing the competency level in all the components of said application area, which will be constituted by:

- 21st-century competences (soft, transversal), common and shared among the majority of professions;
- Professional competences (hard, technical), specific to that profession, and even some of them exclusive to a certain working position.

The hyper-technologization of society will en-

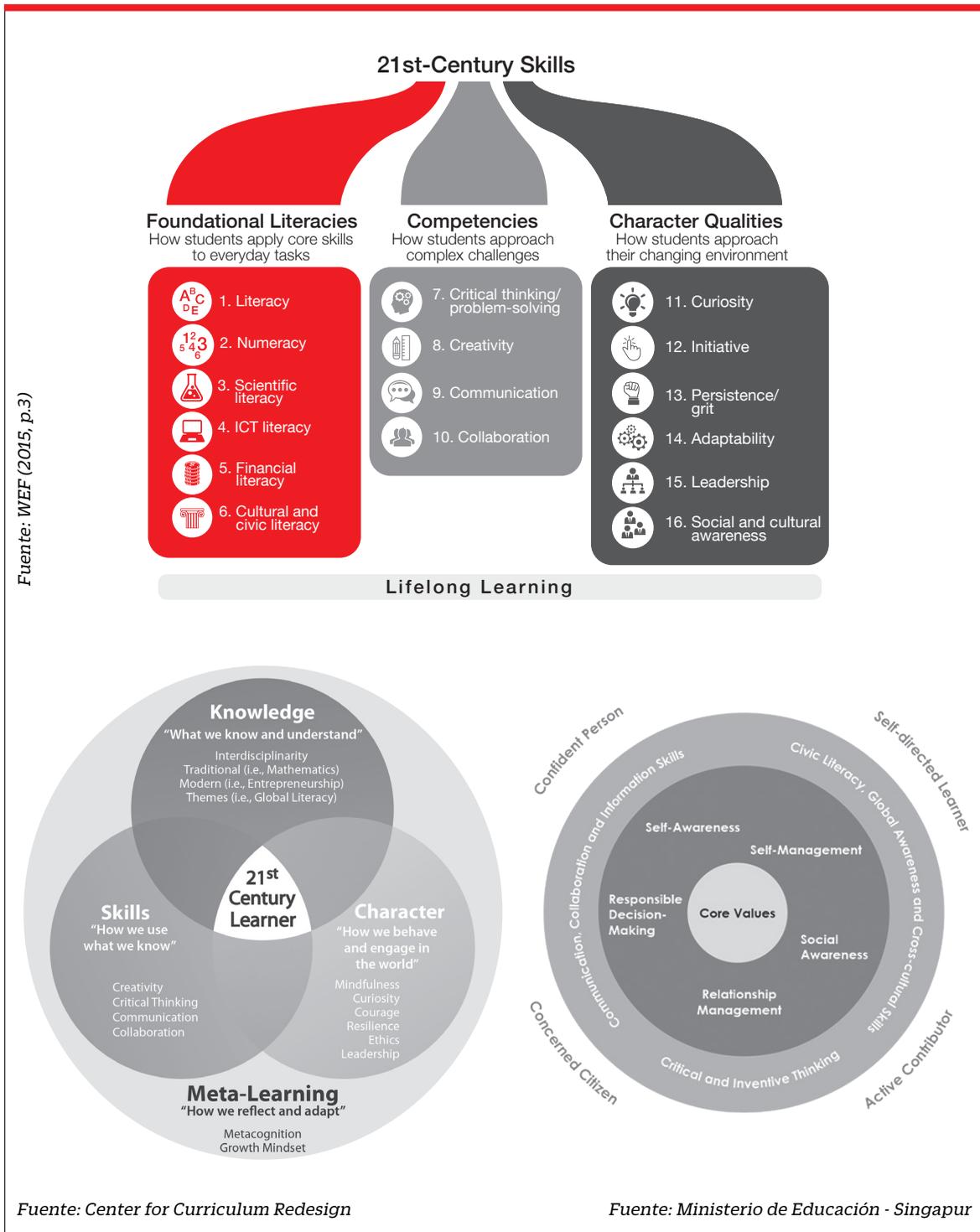
tail the need of knowledge, a hybrid intelligence, in which each person will be assisted by various tools and supports of Artificial Intelligence based on the scope of action -community, working, domestic, social, among others.

Therefore, it will be necessary to develop competences to interact with and utilize Artificial Intelligence and its broad possibilities in a conscious and effective way, while avoiding most negative effects that its development could cause in humans.

Considering the aforementioned, over the last years, there have been several initiatives seeking to specify which transversal competences are required for life -in its widest meaning- in the 21st century (IDB, 2016; European Commission, 2015; WEF, 2015, 2016a, 2016b).

Although there is no unanimous consent on the composition of transversal competences among the various existing lists (Figure 5),

- Creativity
- Effective communication
- Collaboration/Team work
- Critical thinking
- Problem solving



**Figure 5. Different Competence Proposals for the 21st Century.**

- Decision making
- Entrepreneurship
- Digital and media literacy

The new educational models must be developed placing this kind of competences at the center of learning activities, generating open learning ecosystems that allow to:

- Develop the so-called 4 C's: Collaboration, Communication, Critical thinking, and Creativity.
- Promote a lifelong learning culture.
- Provide students with tools and strategies to address the challenges of both the present and the future.
- Respond to the needs and interests of all people, without exclusion.
- Offer different learning ways and methods in contexts that increasingly require technology (tech-rich).
- Encourage the learning communities in global and local contexts.

Initial training, or basic training, will most likely be structured in the medium-term based on this kind of basic competences, making it possible for students to choose among various themes (contents) to work on. The development of personalized itineraries that depend on contexts, interests, and abilities will support the initial training of youngsters. This pathway has already incipiently started in some Spanish universities (Universidad Pompeu Fabra, Universidad Carlos III, Universidad Autónoma de Barcelona) with the so-called open degrees that make it possible to decide taking courses that belong to various degrees at the beginning of the studies. This can be highly fulfilling for the various educational communities and societies, but it can also be a means for widening the gaps and different between them.

Higher Education is also likely to have differentiated pathways between one oriented towards a professional performance or career (conceived very differently to the way we currently understand it because of the previously made considerations) in a knowledge area and one oriented towards personal development, self-fulfillment, and the social-community development. But none of them will be exclusionary.

The first pathway, with an initial basis on the specific knowledge area -not as extensive as it is nowadays-, will be complemented with a more modular training that will continuously develop the personal itinerary for professional performance. This training with a "scalable" nature will be complemented with training (understood in a very wide, active, and participative sense) on more general themes with a sense of both personal development and contribution to and development of the community -at global and local levels-.

In the second pathway, personal learning and development will be performed in contexts of collective activity, mediatized -provided- by technology that, nevertheless, will require -for both its control and its development- a high dosage of ethics and humanism.

### **Introduction of Competences in the Educational System: Professional Training**

As it has been stated previously, the implementation of LOGSE (1990) introduced a new concept of competence in the Spanish educational system. At the time, 5 qualification levels were established at the State level. Said levels were progressively -from 1 to 5- widening the scope of the so-called professional competence based on the knowledge, autonomy, responsibility, complexity, etc. required in the work activity. The realization and delimitation of said levels -though broadly- would make it possible to identify and define the most relevant and appropriate training for each one of them.

In practice, out of the 5 mentioned levels, only 3 were developed in the educational offer, the latter corresponding to Professional Training<sup>2</sup>. Nowadays, they are under the responsibility of the National Institute of Qualifications (INCUAL) and their counterparts in the Autonomous Communities with educational competences. The successive and several educational laws of the Spanish State in these three decades have led to both

2 This is true from the formal education pathway, since there is another pathway for the development/recognition of competences: the working pathway. The latter is developed through the Certificates of Professionalism.

changes and adjustments in the initial proposals like the increase in the number of Professional Families.

Nowadays, Professional Training in Spain comprises 26 Professional Families that -explicitly- take the first three qualification levels as a reference, leaving the following two for the university field (INCUAL, 2015) From the point of view of regulated training, the training proposals that develop them coincide with the Basic Professional Training (Level 1), the Medium-Degree Professional Training (Level 2), and the Higher-Degree Professional Training (Level 3).

In this perspective, as it has been stated earlier, the Professional Competence is set within the working field, understanding said competence as “the set of knowledge and abilities that allow the exercise of the professional activity in accordance with the demands of production and employment” (INCUAL, 2015: 23).

Consistent with has been happening in Europe and encouraged by both the progressive definition and establishment of the Qualifications Frameworks of different countries, that later gave rise to the European Qualifications Framework for Lifelong Learning (EQF), as well as the orientation taken towards the definition of study programs in terms of the Learning Outcomes, by the middle of the first decade of this century, Professional Training in Spain and, therefore, in the Autonomous Communities with competences in the educational sector, started to define all its training programs based on the learning outcomes.

Always maintaining our working reference, the Professional Training of the Basque country in this case, we notice that we have made progress in the development of a model (Astigarraga, Carrera & Agirre, 2017) that, taking professional competences -technical and transversal- as reference, seeks the achievement of the Learning Outcomes by means of active-collaborative methodologies (Agirre, 2015, 2016; Gastón, 2016; Irazola, 2013; Irazola & Gastón, 2013).

Among the keys allowing change in the Professional Training classroom of the Basque country, we can mention the following:

- Clear guidelines and willingness to change led by the Administration itself (Vice-Ministry of Professional Training of the Basque

Government).

- Clearly defined study programs based on the working competences and qualifications, oriented towards the development of the Learning Outcomes.
- Integration of Learning Outcomes related to transversal Competences.
- Training processes for the PT teaching staff and networking in the PT Centers.
- Commitment and support to a change of the Guidelines of the various PT Centers.
- Team work by Cycles by the PT professors.
- Orientation towards understanding the (changing) necessities of companies in their environment by the teaching teams in the PT Centers.

### **Introduction of Competences in the University Setting**

For whatever reasons, the work of developing a referenced competence framework in the working field did not have any incidence on the university context, and the development of the aforementioned Levels 4 and 5 was not carried out.

In the university field, the development of the European Higher Education Area generated different proposals among which we can highlight the Tuning Project (Tuning Educational Structures in Europe) developed since the beginning of the new century. This Project, that could have been an area that -at least in the Spanish context- provided continuity to what was previously started or at least “harmonized” with it, took other conceptual directions and working ways, even though the importance of competences was also assumed (González & Wagenaar, 2003: 34):

Another significant aspect of Tuning is its commitment to consider the qualifications in terms of the learning results and particularly in terms of generic competences (instrumental, interpersonal, and systemic) and competences specific to each subject area (which include skills and knowledge).

However, the concept of competence here differed from the aforementioned since it was exclusively located in the academic field.

In the Tuning Project, the competences

represent a dynamic combination of attributes -with respect to knowledge and its application, attitudes, and responsibilities- that describe the learning results in a specific program or how the students will be able to operate at the end of the educational process. (González & Wagenaar, 2003: 280).

The establishment of the European Qualifications Framework (EQF) in 2008 sought to offer a structure in which the different educational systems could be identified -on the basis of their own realities and structures-. Said framework established eight reference levels described in terms of the learning outcomes, since, as they pointed out, “the EQF recognises that Europe’s education and training systems are so diverse that a shift to learning outcomes is necessary to make comparison and cooperation between countries and institutions possible” (European Commission, 2009: 3). In this context, the learning outcomes were described as “a statement of what a learner knows, understands and is able to do on completion of a learning process. Learning outcomes are specified in three categories – as knowledge, skills and competence” (European Commission, 2009: 11).

Pursuant to the foregoing, it might be thought that the discussion and confusion related to the term competence was ended, but the European Commission described the learning outcomes in terms of “Knowledge, Skills, and Competences,” stating that competences were:

The proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy. (European Commission, 2009: 11).

Therefore, if according to the Tuning Project competences include (describe) the learning outcomes, from the European Commission’s perspective, the learning outcomes include the competences.

Moreover, the definition of competence provided by the European Commission has the potential of combining in it both the working and academic fields, including the personal fields. That is to say competences affect -and are used in- all the

different walks of life. Therefore, when we define the learning outcomes of any training program, said walks of life will need to be taken into consideration—insofar as it is relevant.

For its part, university undergraduate programs emerged as a more or less clear competence reference (based on the qualification) and, at the time of more exhaustively describing the different subjects, modules, etc., learning outcomes were also required, even though there were no clear guidelines for their identification and drafting.

In this context, a support to the learning outcomes came along ANECA. In 2013, this institution published its “Support Guide for the Drafting, Execution, and Evaluation of the Learning Outcomes” which stated that:

In order to obtain the renovation of the qualification accreditation, the university will have to offer detailed information on how the training activity and the applied evaluation methods are directly aligned with the learning outcomes that students need to achieve. (ANECA, 2013: 36).

also indicated that:

The limited experience of the Spanish university system in the use of learning outcomes, in most cases, causes said outcomes to have a description that can be improved. Many times, the learning outcomes included in the study programs turn out to be ambiguous, difficult to understand, or complicated to achieve along the subject or the program. Also, the most common case is having included a very high number of learning outcomes related to the subject and the training, and this hinders the understanding of all the parties involved. (ANECA, 2013: 37).

In Spain (Government of Spain, 2011), the Spanish Qualifications Framework for Higher Education (MECES) was established -subsequently modified in 2015 (Government of Spain, 2015)- and it is structured in four levels (Level 1 - Higher Technical; Level 2 - Undergraduate degree; Level 3 – Master’s degree; and Level 4 - Doctoral degree) that, as it can be observed, includes the three levels of the university context and the Higher Degree Cycles of Professional Training. The connection with the other levels of the European Qualifications

Framework is also established. At the same time, such levels are defined or described in very broad terms of the learning outcomes.

- Level 1 (Higher Technical) of the MECES corresponds to Level 5 of the EQF.
- Level 2 (Undergraduate degree) of the MECES corresponds to Level 6 of the EQF.
- Level 3 (Master's degree) of the MECES corresponds to Level 7 of the EQF.
- Level 4 (Doctoral degree) of the MECES corresponds to Level 8 of the EQF.

Therefore, it is observed that a model, an educational structure, is coming together and settling. Even though this model has different kinds of competences (technical, transversal, etc.) and from different contexts (working, academic, personal, etc.) as references, it is based on a correct identification and description of the Learning Outcomes to develop and evaluate the training processes. As ANECA states (2013: 42):

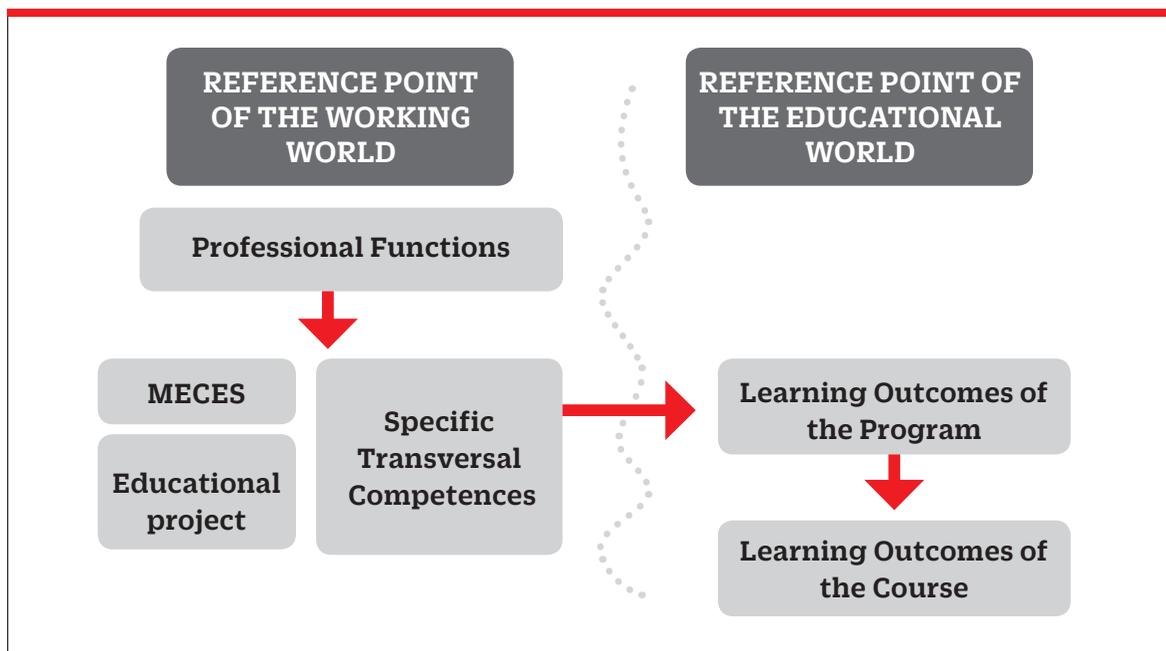
Thus, it underlies the concept of learning outcomes as a key integrative element when defining any national qualifications framework. That is to say, in order to allow the mobility and international recognition

of the qualifications and the training, it is necessary to utilize the learning outcomes tool, since the different levels of the national qualification frameworks are defined based on them.

**Changing the Present with a View to the Future. The Competence-Based Training Model of the School of Humanities and Learning Sciences of Mondragon Unibertsitatea.**

Turning to the practice of and reflection on our context, from the School of Humanities and Learning Sciences of Mondragon Unibertsitatea, with degrees in Childhood Education, Primary Education, and Audiovisual Communications, we started a reflective process for a change in the development and implementation of said degrees a few years ago.

Initially working with the degree in Audiovisual Communications, a curriculum redesign was carried out. Its application in the four years of said undergraduate studies finishes in this academic year. For their part, the degrees in Education have started in the academic year 2017-18 with the implementation of said innovation Along with a



**Figure 6.** Process of Identification of Learning Outcomes. Taken from *Innovando en la Universidad: algunas claves en un proceso de cambio curricular y metodológico*, by A. Ozaeta, A. Mongelos, E. Astigarraga, and E. Garro, 2017: 7.

series of didactic-methodological principles, such as learning focused on the student, the extensive use of ICT's, the promotion of significant learning, the incidence in the development of transversal competences, etc., the axis of the redesign process has meant double of the work of identifying the reference competences of the working world and the consequent definition of Learning Outcomes both for the undergraduate program as a whole and for each of its component courses (Figure 6).

The continuous monitoring (García & Santa Cruz, 2016; Santa Cruz, 2016) that is made on the implementation of said new ways of working in the classroom (and outside of it) allows us to be optimistic regarding the satisfaction level and the obtained results, mainly -given its more advanced development- in the degree in Audiovisual Communications. When we reflect on the keys that are making change possible in our undergraduate programs' classrooms, the same way we have done it with PT, we can mention the following:

- Conviction and need for change in the university teaching-learning processes.
- Commitment and support to change by the Academic Direction of the School.
- Driving force of professors that lead and make change easier.
- Team work of the undergraduate program professors.
- Training processes for the undergraduate program professors, which will continuously empower them.
- Orientation towards the understanding of the (changing) necessities of the current society by the undergraduate program professors.

### **Making the Shift of Model a Reality. Dual Training in the training of professors at the Universitat de Lleida.**

One of the training methods that better facilitate the integration of specific and transversal competences is dual training since it mixes training in the university field with training carried out at the work place.

Since the academic year 2012-13, the School of Education, Psychology and Social Work of the Universitat de Lleida has launched an initiative,

pioneering in due course and already well-established currently, of dual training in a group of 60 students by cohort of the degree in Primary Education. The training is performed in the university and the school since the first academic year on a proportion of 60% and 40% respectively. This early and continuous presence in the school has the aim of promoting the development of professor professionalism since the beginning of university training in various kinds of school centers, which is materialized -throughout the four academic years of the undergraduate program- in the following training objectives (Coiduras, Isus & del Arco, 2015).

- First academic year (standard centers): Approaching the profession's knowledge and validating the training decision.
- Second academic year (rural school area): Intervening in the primary education classroom in the rural school.
- Third academic year (high diversity centers): Developing an action research, part of the teacher's intervention itself.
- Fourth academic year (all the center's typologies): Preparing the occupational integration.

The adopted dual training model is the integrative (Bourgeon, 1979) or interactive (Meirieu, 2011) that is characterized by incorporating permanent support in the training processes that are carried out at the school and the university. Compared to the juxtaposing and associative models, the integrative model incorporates strategies and actions that permanently link both training experiences working from the analysis, reflection, induction, and deduction of the cognitive and competence developments that take place in both training environments.

Based on the scientific literature and our experience, we have identified a series of educational and organizational keys that are crucial for materializing the integration-interaction. They are: 1) partnership; 2) professional activity, 3) knowledge; 4) learning integration; 5) alternating the time and rhythm between sceneries; 6) transfer between contexts; 7) accompanying and monitoring the student-learner; and 8) the role of all ICTs in the initial teaching training (Coiduras, Correa, Boudjaoui & Curto, 2017).

In the case of teacher's training, partnership is put together through a solid institutional association with a strong involvement in schools, educational administration, and universities that, in our experience, is articulated through a Joint Commission with the participation of all these agents. Its contribution to the designing of the training plan, the training organization, and the development of the study program are crucial.

The professional activity entails the student to appropriate the conceptual frameworks, arrange them to the training actions design in a specific school context in which they will act as teachers, apply them to their educational interventions, and use them as support for the reflection and analysis of the activity itself.

Regarding the knowledge necessary for the professional development, these are not restricted to only the theoretical knowledge, but, according to Maubant, Triby & Denoux (2014), it has to be knowledge from the practice, knowledge based on the practice, and knowledge for the practice.

For the learning integration to happen, the designed dual training mechanism "has to promote the mobilization of the internal and external resources in the university and school activities and use reflection as a permanent confrontation between the experiences and the obtained results" (Coiduras et al., 2017: 93).

In our case, the alternation of sceneries is assured with the presence of the student in two complete days during the school week throughout the whole academic year under the role of the trainee teacher and the other three days developing the training activity at the university.

Connection and transfer between contexts is guaranteed through the monthly meetings of the Joint Commission, undertaking school-university activities, academic tutors' visits to the schools, the students' observations and evaluations in the school classroom, and undertaking joint training actions of teachers and professors.

The accompanying is carried out through the school tutor and the university tutor. Since the beginning of our experience (Coiduras, Paris, Torrelles & Carrera, 2014), we have identified the importance that both have in the dialogic strategies and the strategies related to the meanings negotiation and their mediator role with the student so that,

based on the understanding and reflection, the tendency to modeling and imitation is overcome.

Digital technologies are also an essential contribution in our model for the integrative training to become a reality. The use of Sakai as a learning management tool, of Eduportfolio as an electronic personal portfolio of each student, and of videos for providing and analyzing own and others' practical experiences contribute to a more efficient learning accompanying and integration.

## Conclusions

In this paper, we have intended to show that the exponential increase of technology in all walks of life will lead to big social and working changes that will certainly have environmental, ethical, life-quality, etc. consequences globally.

From the working perspective, these changes lead to both the extinction of work places and the creation of other new ones -being unable to estimate where the scale will be tipping towards-, as well as the modification of the majority that remain. This means that some competences will become obsolete, it will be necessary to modify/update others, and, lastly, it will be necessary to acquire new ones, from which some are unknown nowadays.

Regarding the demanded competences, employments are becoming polarized as automation—something that Kaplan (2016) calls "fake workers"—increases hand in hand with an improvement and increase in Artificial Intelligence—which Kaplan (2016) calls "synthetic intellects."

Overall, more complex competences and an increased number of them will be needed, the socio-emotional competences being the ones that will make a difference in maintaining employments. Meanwhile, and in both ends of the complexity level, a hybrid intelligence that knows how to take advantage of the Artificial Intelligence possibilities will be required for the personal, social, and professional development of people. But this hybrid intelligence, apart from being individual, is also collective, therefore a social action being the competence development.

Basic training will be developed based on the so-called "21st-century competences", among

which the 4 C's are taking a predominant role: **Communication, Critical Thinking, Collaboration, and Creativity**. As we can see in different countries and proposals, training will be increasingly developed taking the person as a whole into consideration, interacting with those 21st-century competences with all kinds of contents easily available based on their own contexts and necessities. Training will be personalized and developed socially from the stakeholders, and it will be oriented towards personal and community development. Additionally, there will be people that look for a personal development through the professional activity. This activity will have a diverse nature: Sometimes a personal nature, and sometimes of general interest, and it will be discontinuously performed in time and space. In this context, learning how to learn and having strategies and techniques to learn will be increasingly important.

In Spain, said pathway started three decades ago in Professional Training with defined curricular designs based on competences, while the university has incorporated competences in their undergraduate and graduate programs in the last decade. Process is being made in both formative contexts, with different rhythms and results, in the training of and from specific competences, while the integration in the training of transversal competences still is a pending task in general.

The current training has started to modify its action guidelines in some places, incorporating strong initiatives -flexible programs, curricular redesign focused on competences and the learning outcomes, the adoption of a model focused on active and collaborative methodologies, or dual training are some examples- that seek to respond to the new training demands. But it does not seem sufficient. We need a change in the educational environment that allows: a) the definition of new educational focal points (purposes, objectives, and contents); b) methodological and organizational changes for the development of 21st-century competences; c) new spaces that make working and the interaction possible beyond the closed classrooms, the class groups, the school or educational center itself; d) reconsidering the evaluation processes in view of all of this, focusing on evaluation as a learning support and the learning outcomes as the axis to design it and

carry it out; e) rethinking and reimagining -in a critical manner- the possibilities that the exponential technological breakthroughs gives us to develop all the aforementioned, from both a personal point of view and a community perspective.

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