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# Enhancing Skills for Employment in the Workplace of the Future 2020 Using the Theory of Connectivity: Shared and Adaptive Personal Learning Environments in a Spanish Context

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**Abstract:** European living environments are well placed as an essential means through which cities become functional, modern, and liveable places, and are the ideal setting for the innovation and implementation of businesses and ideas. In addition, they are a place in which existing gaps in labour market inclusion are easily widened amongst those who, for various reasons, have not received adequate training, such as immigrants (including unaccompanied foreign minors) and young people without qualifications that have several difficulties in the access to higher education. Further, as is noted in the Phoenix report entitled Future Work Skills 2020, our educational system suffers from a lack of training with regards to the employment skills that need to be integrated into current society, as these have a crucial role for achieving success in the workplace. The aim of this study is to analyse the key skills for the inclusion of Unaccompanied Foreign Minors (UFM) in the workplace, developing a scale for the assessment of ten basic skills for the work of the future. These individuals are mostly young people without qualifications trying to make it in the new environments of current Smart Cities. This study employs an empirical and experimental methodology with two comparison groups of UFM adolescents. The UFM population is contextualised by the migratory flow from North Africa to Europe. Multistage sampling was used to select 345 participants. An approximation scale of the level of Future Work Skills was created as a data collection instrument through simulations of Horizon 2020 (EA-HFL-SH2020). Multivariate analysis was performed which revealed significant differences between school variables, work experience and educational level. The results are aligned with the evaluation of skill acquisition level for the working future of UFM and with the proposed training model of work skills that facilitate their inclusion in the world of the European workforce, as a function of the significant differences found. In addition, the emphasis is placed on the interest of identifying this type of skills in this group in order to develop appropriate training programs in higher education for employment success.

**Keywords:** migrant minors; future work skills; European labour market; Smart city; professional training; socio-laboural exclusion

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## 1. Introduction

### 1.1. Background

The European workforce, and its establishment in training for employment in the Mediterranean basin, is in a constant state of change due to the new social demands and changes occurring within work

settings. In this environment, there is also a high risk of social and labour exclusion for adolescents who do not have access to essential skills for their development into adult life in a future society which is designed upon Smart City schemes [1,2]. These types of cities refer to a type of urban development, based on sustainability, that is capable of responding appropriately to the basic needs of institutions, businesses and citizens, considering economic, operational, social and environmental issues ensuring sustainable development [3]. Likewise, Smart Cities considers the use of technology in an indispensable way, involving it in the forms of communication, production and development. Therefore, young people must be trained on the basis of connectivity theory [2], since the skills they must learn for their future work will be based on the digital age and within the Smart Cities. Thus, this type of skills is essential to promote insertion, autonomy and success in different educational stages, which will facilitate employment inclusion by providing the competences and knowledge necessary for professional success [4]. The EU proposes that the Smart City concept is divided into six sectors as a function of the services with which they are associated [3,5]:

- Smart economy (e-business, e-commerce): increase in productivity thanks to ICT, advanced industry, innovation, provision of services, new products/services/business models and entrepreneurship.
- Smart environment: Smart energy (renewable, smart grids, metering), control and monitoring of pollution, renovation of buildings and services, green buildings, green urban planning, efficient use of resources, street lighting, waste management, drainage systems and management of monitored water resources.
- Smart government: transparency, Open Data, e-government, participatory decision making, co-created e-Services.
- Smart living: lifestyle/behaviour/consumption based on ICT, healthy and safe living in a city that vibrates with culture, good quality housing and accommodation, high levels of social cohesion.
- Smart mobility: ICT-based integrated transport, logistic systems, clean transport options (non-motorised), real-time information, user-provided data to improve the system.
- Smart people: e-skills, ICT related work, access to education and training, inclusive, creative and innovative society to introduce, use, manipulate and personalise data, decision making and creation of products and services.

With all this, we can add that cities can be considered intelligent, not for the technology that can be installed in their territory but for their capacity to generate knowledge that can create improvements for the citizen's experience. At the same time, these actions are compatible with improvements in cost-effectiveness and sustainability in the daily life of residents and visitors. As indicated by Domínguez et al. [6]: "all of this handling of technologies should therefore have the objective of being for a "better living", maintaining a balance with the environment and allowing sustainable development. Hence, this is the new challenge for Smart Cities". In fact, Albino et al. [7] establish how Smart Cities are the centre of higher education, since it allows the development of more creative people, with better training and with different skills for the context of work. Thus, Smart Cities exploit the human potential that is developed in various educational stages and that culminates in higher education, which converges in feedback between the city itself and people.

Inclusive societies or Smart Human Cities are based on social models that do not leave behind or ignore those individuals who find themselves excluded or at a high risk of exclusion due to their situation [8]. However, in order to be able to act in an efficient way, special attention should be given to a number of situations that exist in regard to disadvantaged social classes. These include periods of economic crisis in which the population at high socio-labour risk is oversized, migrations that are not always well received when they relate to clustered populations with determined social, economic and working characteristics, and economic models that specifically exclude young people or new technological settings which can broaden even further the concept of the disadvantaged class [9].

These situations pose questions about aspects that have not previously been thought about but that requires changing in respect to training. These include new social settings, and political and economic situations that are not always considered by formal education training content. The need for educational attention within diverse young immigrant populations with access to resources in an unequal society—in each stage, and especially in higher education—the design of training processes such as elements that correct inequality, appropriateness of massive and sometimes uncontrolled ITC use so that it does not become another element contributing to discrimination. Therefore, there is a need to permanently update studies of training and qualification for future employees, faced with social, political, and economic uncertainty and volatility [10,11].

## 1.2. Literature Review

The Phoenix report of Future Work Skills H2020 [12] proposes these as a possible route to enabling the achievement of success in the workforce. They are also suggested as a way of overcoming the challenges that will be faced by society over the coming years with the implementation of Smart Cities as realities that will become solidified in the changing model of city and society. The aforementioned competencies are specified in the following skills:

- Skill of creating meaning, or ability to determine the deeper meaning or significance of what is expressed.
- Skill of social intelligence, or ability to connect with others in a deep and direct way in order to feel and stimulate desired reactions and interactions.
- Skill of original and adaptive thought, with regards to the sufficiency of thought and appearance of solutions and answers beyond that which is routine or based on norms.
- Skill of trans-cultural competence, or ability to operate in different cultural contexts.
- Skill of computational thinking for transferring large quantities of data into abstract concepts and for understanding data-based reasoning.
- Skill of literacy in new means of communication in order to critically evaluate and develop content used by new means of communication, and to leverage these means for persuasive communication.
- Skill of transdisciplinarity for understanding concepts through multiple disciplines.
- Skill of developing a way of thinking in order to represent and develop work tasks and processes for the desired results.
- Skill of cognitive load management or ability to discriminate and filter information according to the order of importance and to understand how to take full advantage of cognitive functioning via a variety of tools and techniques.
- Skill of virtual collaboration in order to work productively, guide management and demonstrate presence as a member of a virtual team.

Nevertheless, educational systems for these skills are not formed to suit the alumni [13], nor is the model of interactions between the skills. This is important so that skills come together and operate efficiently in order to encourage the inclusion of adolescents in the workforce and in lifetime learning [14]. In this sense, studies such as those carried out by Hyttinen et al. [15] or Kivunja [16] show the positive effects of the integration between skills for work, research and higher education. This is not only due to the fact that the professionalising degrees are acquired in the university, but in this, the future trainers and professors are trained who will develop this type of skills in adolescents in previous educational stages.

The acquisition of these skills for the working world is essential for young people from the early stages. However, it acquires even more relevance in those foreign minors in order to favour an effective insertion in society. At this point appears the concept of Unaccompanied Foreign Minors (UFM), which are characterized by being under 18 years old, from third countries and arriving in Spanish territory without an adult who is responsible for them [17], generating a situation of uncertainty and precariousness. Specifically, in the case of UFM, a lack of fit is observed between the problems

highlighted in these young people, the resources offered to them and the actual needs of the UFM. This is due to a lack of consideration of aspects such as the change in schooling, their lack of previous working experience and their educational level, together with the state of being undocumented and the perception of loneliness that they face [18]. Therefore, it is essential the acquisition of skills for work in this group, especially those linked to Smart Cities, since they represent a context in which UFM will have to develop and to which they are not adapted. Likewise, all this must occur in parallel to the educational process developed in institutions [19,20]. Thus, it seems obvious that at both a theoretical and normative level, there is an acceptance of the principle of educational inclusion. There is a clear need to tackle this problem, taking into consideration the needs linked to the development of an appropriate socio-educational intervention focused on addressing them. Intervention design should consider the individual perceptions of the UFM in social, academic and labour dimensions. This should be contemplated alongside training needs in skills and abilities in order to be able to adequately intervene and achieve good social insertion and integration [21].

The purpose of the present study is to analyse the level of acquisition of Future Work Skills of UFM and how these levels are related with variables describing schooling, work experience and educational level -what could be a starting point for higher education when considering the job skills of non-graduates UFM adolescents-. This level of analysis seeks to produce a reflection about the value of systematising and promoting the construction of training programs linked to these skills, together with the need for these skills to be adjusted to each group of young people and the demands of society. The aim of this is to facilitate their inclusion within a workforce in which new parameters are increasingly being established, as determined by Smart Cities and their new technological fabric.

From this perspective, the initial hypothesis is defined in the following terms:

- H1: The degree of acquisition of Future Work Skills in the Smart City is linked with the schooling situation, incorporation within the workforce of the young person and the educational level.

In considering this hypothesis, the following objectives were proposed:

- O1: To develop, validate and apply a descriptive scale to the estimation of the Future Skills of the Smart City within adolescent UFM.
- O2: To evaluate the level of skill acquisition for the working future of UFM who find themselves in cities in the South of Europe.
- O3: To analyse the degree of Future Work Skill acquisition in each one of the participating groups as a function of the variables: schooling, work experience and educational level.

## 2. Materials and Methods

### 2.1. Design and Participants

The population under study is composed of groups of UFM at Reception Centres in border cities in the South of Europe. They will be examined as a function of the situation in which they find themselves and from which they come. The following cases are therefore possible: unaccompanied foreign minor, schooled/not schooled, work experience/no work experience, and educational level. The concept of unaccompanied immigrant minors encapsulates the following characteristics: (a) children and adolescents younger than 18 years old, migrating alone or accompanied, (b) outside of their country of origin, (c) separated from the people who, by law or custom, are responsible for them, (d) who have accessed the destination country through an irregular asylum application. The profile of unaccompanied immigrant minors on the southern border of Europe describes Moroccan minors aged between 11 and 18 years, who have arrived in Spain in order to search for a life which they have heard about from other individuals who are known to them. In these cases, influential factors include the influence of their family, though decisions can also be entirely voluntary.

Sample selection was carried out following a multi-stage process. Firstly, a purposeful selection was made of Reception Centres with the greatest number of UFM with ages reported between 11-18

years. This age range has been considered in order to obtain a representative sample of UFM residents in southern Spain. Likewise, age is not established as a determining factor of work skills in this population, since the majority of UFM residents are not in school and their residence time in Spain does not exceed one year. Following this, stratified sampling was used to select 345 UFM residents. This method considered the following variables and levels (Table 1):

- Schooling: schooled/not schooled, according to schooling levels of this population in the Spanish Educational System.
- Self-reported highest level of qualification (curricular competence): Primary Education/Compulsory Secondary Education/Bachelor's degree/Professional Training, according to levels provided in previous reports by Reception Centres.
- Labour activity: Some labour activity/without any labour activity. Considering any type of working activity or experiences, even that which is discontinuous in nature and without regulated economic payment. Although it is illegal for children under 16 years of age to work in the European context, UFM residents from countries outside the EU usually have had irregular and intermittent work experiences from an earlier age of eleven years.

**Table 1.** Distribution of the sample according to strata.

Variables and Levels		Frequency	Percentage	Valid Percentage
Schooling	Schooled	18	5.2	5.2
	Not schooled	327	94.8	94.8
Highest qualification achieved	Primary	119	34.5	34.5
	Compulsory Secondary	119	34.5	34.5
	Bachelor's	19	5.5	5.5
	Professional Training	88	25.5	25.5
Self-reported labour activity	With experience	137	39.7	39.7
	Without experience	207	60.0	60.0

## 2.2. Measure

A descriptive estimation scale for adolescents was constructed as a data collection instrument that sought to establish the work skills identified in the Future Skills 2020 project of Davies et al. [11] in UFM undertaking PE, CSE, a bachelor's degree, or PT. The descriptive scale is constructed with the help of a five experts panel using a Delphi Technique with two rounds. In the first consultation, 20 descriptive levels of use and acquisition of each skill that make up the scale are described. In the second round these levels are grouped in four: The first level groups 11 descriptions of use that suppose an insufficient level of acquisition of the skill, the second level 3 descriptions that suppose a sufficient level, the third group 4 descriptions that suppose a high level and the fourth group 3 descriptions of an excellent acquisition of the skill. Thus, the statements presented are descriptive and composed of ten skills, each with four levels describing their purpose and with a score of Level 1 (0–10), Level 2 (11–13), Level 3 (14–17), Level 4 (18–20). Each skill carries a detailed description of its characteristics and includes a simulated situation in order to guarantee that all of the individuals interviewed provided their responses from the same standpoint (See Appendix A): Approximation scale of the level of Future Work Skills applied to simulations from Horizon 2020 (EA-HFL-SH2020). The overall reliability of the scale according to Cronbach Alpha was 0.669.

## 2.3. Data Analysis

The software IBM SPSS® 22.0 (IBM Corp, Armonk, NY, USA) was used for statistical analysis. Frequencies and medians were used to describe the included variables. Associations between variables were analysed using ANOVA test. Cronbach's alpha coefficient was used to analyse the internal reliability of all included instruments. The significance level was set at 0.05 [7].

### 3. Results

With regards to the level shown by the overall sample of adolescent UFM in relation to the schooling variable, labour experience and educational level, it is notable that 5.2% reported themselves as being schooled compared to 94.8% who were not. The level of curricular competence declared was 34.5% as competent in Primary Education (11 years), 34.5% in Compulsory Secondary Education (12–15 years), 5.5% with a bachelor's degree (16–18 years) and 25.5% who had received Professional Training (14–18 years). Of all of these adolescents, 39.7% declared some kind of previous working activity in sporadic jobs and jobs without contracts.

The degree of acquisition of work skills is observed through frequencies and we can see that scores were reported at a minimum-low level in all cases except for the skill of: to make sense, and novel and adaptive thinking. The mean of these skills indicates a high level of acquisition (see Table 2). The means and variances in each one of the skills indicates little dispersion within responses and shows that the scores are grouped towards the centre, except in the case of cultural skills ( $X = 13.46$ ,  $S = 4.122$ ,  $\partial = 16.989$ ) and virtual collaboration skills ( $X = 13.90$ ,  $S = 4.092$ ,  $\partial = 16.747$ ).

**Table 2.** Scores for future work skills (FWS) and level of acquisition.

Skills	Scores							
	N	0–10 <sup>a</sup>	11–13 <sup>b</sup>	14–17 <sup>c</sup>	18–20 <sup>d</sup>	Median	Standard Deviation	Variance
FWS 1 To make sense	344	100	111	80	53	14.11	3.617	13.084
FWS 2 Social intelligence	343	132	106	62	43	13.45	3.512	12.336
FWS 3 Novel and adaptive thinking	344	93	114	93	44	14.17	3.421	11.701
FWS 4 Cultural skills	344	180	43	50	71	13.46	4.122	16.989
FWS 5 Computational thinking	344	114	85	72	73	14.33	3.874	15.008
FWS 6 Command of new media	344	146	89	70	39	13.33	3.543	12.556
FWS 7 Integration of disciplines	344	143	84	57	60	13.64	3.818	14.576
FWS 8 Design mentality	344	161	88	60	35	13.01	3.467	12.023
FWS 9 Intellect management	344	165	82	63	34	12.99	3.482	12.125
FWS 10 Virtual collaboration	344	148	68	48	80	13.90	4.092	16.747

<sup>a</sup> Minimum level achieved for the skill. See Appendix A. <sup>b</sup> Low level achieved for the skill. See Appendix A. <sup>c</sup> High level achieved for the skill. See Appendix A. <sup>d</sup> Maximum level achieved for the skill. See Appendix A. Source: Elaborated by the authors.

Differences between related groups were examined as a function of the variables studied at a descriptive level based on the means found and via an analysis of variance (ANOVA of a factor). The extracted results show significant differences in terms of the schooling situation (Table 3), in the skills describing novel and adaptive thinking skills in order to provide responses beyond those which are simply memorised or based on norms ( $p = 0.002$ ), computational thinking skills ( $p = 0.005$ ), skill of critically evaluating and developing content that is used by new types of media and leveraging this for persuasive communication ( $p = 0.006$ ), skill of knowledge integration for the better understanding of concepts through multiple disciplines ( $p = 0.024$ ), and productive working skills to promote involvement and demonstrate presence as a member of a virtual team ( $p = 0.028$ ).

**Table 3.** ANOVA of the factor pertaining to schooled and non-schooled groups.

Skills (FWS)		Sum of Squares	df	Squared Mean	F	Sig.
FWS 3 Novel and adaptive thinking	Inter-groups	108.306	1	108.306	9.485	0.002
	Intra-groups	3905.249	342	11.419		
	Total	4013.555	343			
FWS 5 Computational thinking	Inter-groups	118.252	1	118.252	8.041	0.005
	Intra-groups	5029.629	342	14.707		
	Total	5147.881	343			
FWS 6 Command of new media	Inter-groups	93.879	1	93.879	7.621	0.006
	Intra-groups	4212.677	342	12.318		
	Total	4306.555	343			
FWS 7 Integration of disciplines	Inter-groups	73.710	1	73.710	5.118	0.024
	Intra-groups	4925.868	342	14.403		
	Total	4999.578	343			
	Intra-groups	4128.617	342	12.072		
	Total	4158.927	343			
FWS 10 Virtual collaboration	Inter-groups	80.760	1	80.760	4.877	0.028
	Intra-groups	5663.472	342	16.560		
	Total	5744.233	343			

Source: Elaborated by the authors.

Extracted results show significant differences in terms of educational level, in the skills describing novel and adaptive thinking skills (Table 4) for providing responses beyond those that are simply memorised or based on norms ( $p = 0.004$ ), computational thinking skills ( $p = 0.03$ ), skill of critically evaluating and developing content that is used by new media and leveraging this for persuasive communication ( $p = 0.044$ ), and the skill of knowledge integration for a better understanding of concepts through multiple disciplines ( $p = 0.003$ ).

**Table 4.** ANOVA of the factor pertaining to groups determined by reported curricular competence.

Skills (FWS)		Sum of Squares	df	Squared Mean	F	Sig.
FWS 5 Computational thinking	Inter-groups	133.636	3	44.545	3.020	0.030
	Intra-groups	5014.244	340	14.748		
	Total	5147.881	343			
FWS 6 Command of new media	Inter-groups	101.275	3	33.758	2.729	0.044
	Intra-groups	4205.280	340	12.368		
	Total	4306.555	343			
FWS 7 Integration of disciplines	Inter-groups	202.873	3	67.624	4.793	0.003
	Intra-groups	4796.705	340	14.108		
	Total	4999.578	343			

Source: Elaborated by the authors.

The extracted results show significant differences in terms of participants' level of work experience (Table 5), this is seen in the skills describing cultural skills ( $p = 0.027$ ) and intellect management skills for evaluating and filtering relevant information and understanding how to maximise comprehension ( $p = 0.003$ ).

**Table 5.** ANOVA of the factor pertaining to groups with labour activities and without labour activities.

Skill		Sum of Squares	df	Squared Mean	F	Sig.
FWS 4 Cultural skills	Inter-groups	121.849	2	60.925	3.641	0.027
	Intra-groups	5705.496	341	16.732		
	Total	5827.346	343			
FWS 9 Intellect management	Inter-groups	78.930	2	39.465	3.298	0.038
	Intra-groups	4079.997	341	11.965		
	Total	4158.927	343			

Source: Elaboration by the authors.

Overall, and by way of summary, Table 6 shows the influence of the moderating variables and the levels that these variables can adopt in the development of future work skills within the sample. The first two variables that are academic/school-based in nature are schooling and the level of curricular competence (highest qualification) declared. These have a greater influence on cognitive variables and are more developed in schooled participants. Further, these skills were more developed within those who engaged in labour activities, which are usually developed within a social context requiring social skills.

**Table 6.** Differences between groups in comparison variables and future work skills.

Variable	Level (* Group with higher mean values in the indicated skills)	Skills									
		FWS 1: To make sense FWS2: Social intelligence FWS3: Novel and adaptive thinking FWS4: Cultural skills FWS5: Computational thinking					FWS 6: Command of new media FWS 7: Integration of disciplines FWS 8: Design mentality FWS 9: Intellect management FWS 10: Virtual collaboration				
		1	2	3	4	5	6	7	8	9	10
Schooling	Schooled */not schooled			X		X	X	X			X
Self-reported curricular competence	Primary/Secondary education/Bachelor degree/Professional training.					X	X	X			
Labour activity	With some labour activity */without any labour activity.				X					X	

Source: Elaborated by the authors. (\*) Group with higher mean values in the indicated skills

#### 4. Discussion and Conclusions

The present research proposes to analyse the degree of acquisition of the ten future work skills, presented by the Phoenix report entitled Future Work Skills in H2020 [12], within each group of adolescent UFM's selected for inclusion in the present study. For this, an ad hoc instrument was created called approximation scale of Future Work Skills applied to Horizon 2020 simulations (EA-HFL-SH2020). Therefore, a preliminary analysis of the scale on skills for work is carried out as a pilot study, in order to carry out a subsequent validation and analysis of the psychometric properties of the instrument in a specific way in the UFM collective and in other contexts.

Creation of the EA-HFL-SH2020 scale carries with it a number of advantages which facilitate its application. These include the speed of data collection and the use of more sophisticated quantitative treatments. Further, according to Jarvis et al. [22], it offers "ease of use for registering behaviours that would be less accessible using other media". If a comparison is made with other studies, specifically with the Page Executive Report [23] entitled "the 10 competencies most demanded by companies in the Spanish job market", we can verify that a number of similarities exist between the findings of the present study and the outcomes of this other research. The similarities are as follows:



- Skill of making sense → Appropriate and continuous training: In some way, we can say that these two skills have a certain degree of similarity, in that they require experiences and continuous training in order to facilitate strategy development or the production of solutions.
- Social intelligence skills → Working in a team: These may be related in that in order to conduct optimal working within a team, individuals have to effectively interact with others.
- Novel and adaptive thinking skills → Added value: These both show characteristics that relate to the effectiveness and ease of tackling problems that can arise when entering a new or unknown environment. It is because of this that individuals not only have to deal with that which is known to them, but also the unknown.
- Cultural skills → International experience: These coincide in the fact that having studied or worked in a foreign country can be a key factor at the time of developing cultural skills. In this way, the need arises to acquire and deepen transcultural competencies. In other words, those skills that enable individuals to operate with a certain fluency in unknown cultural contexts that are distant from their own.

Another similarity found is that these skills are developed in consonance with the constant technological and socio-economic changes currently shaking the world, in the same way, that they make reference to Smart Cities. However, with regards to the rest of the skills studied such as computational thinking and virtual collaboration, the findings were not found to be similar to those described in the aforementioned report, given that no skill from the Page Executive Report [6–23] makes reference to ICT. Nevertheless, in the study from the Jarvis et al. [22], we can find data with more similarities. Above all with the development of ICT, which is ultimately the most relevant of the 10 analysed skills in the present research. For this reason, we can say that businesses require people with greater spectrums of general knowledge, such as foreign languages and good handling of digital tools, in addition to greater socio-emotional skills and working methods, such as team working, responsibility, and commitment. This broad spectrum of skills and abilities should be developed from an early age in all educational stages, achieve their culmination in higher education and, especially, those foreign minors that have to adapt them to a different sociocultural context and language [20].

Definitively, we can confirm that the descriptive estimation scale is an instrument totally adapted to the skills that should be pursued as basic, so that graduates of the educational system moving into the workplace experience an efficient insertion into the world of work. This scale is reliable and the simulated situations (See Appendix A) established in each skill are appropriately adjusted to suit the UFM population, with no doubts being displayed in responses.

In relation to the level of Future Work Skills (FWS) established through application of the EA-HFL-SH2020 scale, we can verify that all participants had developed minimum-low levels of the ten FWS and that a lack of training existed for the development of these skills in general. Only when examining the skill FWS1 to find meaning and the skill FWS3 novel and adaptive thinking, were slightly higher levels of acquisition found. These are related to the basic competencies established from the OECD project for the Definition and Selection of Competencies [24,25]. This studied the competencies that are key for a prosperous life and the ASEM initiative that defines essential competencies in the context of lifelong learning and that must be worked transversally in secondary and higher education [26,27]:

- Competence 1—Linguistic; use of language as an instrument of oral and written communication, as much in the Spanish language as the foreign tongue. Command of language brings with it the ability to convey messages for a rigorous understanding that matches what the person or author of this message wants to say. This gives the most objective interpretation possible so that the true meaning can be deciphered.
- Competence 7—Learn to learn (cognitive skills); learning strategies: attention, comprehension, memory, perception, thought processing (observation, analysis, classification, representation, interpretation and evaluation).

- Competence 8—Autonomy and personal initiative; becoming conscious of one’s knowledge, competencies and environment, and being able to act on/within them; being able to discover opportunities, putting personal projects into action and participating in group projects; finally, provides help to the individual to find their place in the world.

These higher levels for the skills of FWS1 and FWS2 are a consequence of the situation of the UFM themselves. This strengthens these skills in that their situation is characterised by the command of various languages given that they find themselves in a foreign country. The situation of an unaccompanied foreign minor makes it possible to identify that those individuals who are capable of using judgement to make decisions and face the consequences with a positive attitude towards change and innovation can face new challenges [17]. This requires a strategic vision of challenges and healthy personal, academic and professional ambition that must be developed from each educational stage with specific emphasis on university stages. This is because the skills that allow access to a profession are acquired in higher education. In addition, these institutions train future professionals who will teach ungraduated people in high school [28].

Significant differences are seen in the analysis of related groups as a function of the variables describing: schooling, self-reported level of curricular competence (primary education/compulsory secondary education/bachelor’s degree/professional training) and labour activity. In the variable relating to schooling, it is highlighted that of the 345 individuals interviewed only 5.2% reported being currently schooled in an ordinary educational centre. This does not mean that they were not being schooled in their country of origin as it actually seems that they were when we analyse these data together with their self-reported curricular competence: 34.5% primary education, 34.5% compulsory secondary education, 5.5% bachelor’s degree and 25.5% professional training. These data indicate a clear interruption to the academic development of UFM. The WCEFA [29], entitled “Satisfaction of basic learning needs” and the Declaration of the World Summit in Favour of Infancy recognise basic education as the cement that holds together all learning and of all subsequent education of people. In the majority of countries, including those in the process of development, this is not limited to primary education but also considers inferior secondary education [30,31]. When this schooling or the continuity of this schooling is not assured, inclusion and future work development are denied. Evidence of this is provided through the significant differences found favouring schooled UFM with regards to five of the ten skills studied: FWS3, FWS5, FWS6, FWS7 and FWS10. These skills demand the dominion of:

- Basic competencies: (2) mathematical reasoning, (4) treatment of information and digital competence.
- Capacity to investigate information from different sources and critically compare it before arriving at an interpretation.
- Computer knowledge (digital competencies).
- Leadership capacity.
- Capacity to investigate information from different sources and critically compare it before arriving at an interpretation (digital competence).
- Command of social skills: interpersonal relationships (social competence).
- Command of skills for effective communication: active listening, empathy and assertiveness.

This means that UFM without schooling are in a grave situation of social disadvantage. Further, if we compare these localised differences in the schooling variable with the findings for the reported level of curricular competence variable, these same findings appear in FWS5, FWS6, and FWS7.

Another notable conclusion to be extracted from this analysis is the finding that the skills were more strongly linked with labour activity and experience in the working environment. When considering these results, we must consider FWS4 or cultural skills, and FWS9 or intellect management skills for the discrimination and filtering of relevant information and to understand how to maximise comprehension. Greater dispersion and variance were found in the responses relating to these two

aspects indicating that two clear groups emerge based on their responses. These are those with labour activity and those without. Clearly, the differences found are seen to favour those who count on some form of labour activity. We can say that these skills are fundamentally developed in a socio-labour context, in a multi-cultural society such as that found in Europe and in its Smart Cities. This demands dominion of:

- Efficient communication skills: active listening, empathy, assertiveness.
- Social skills.
- Social values.
- Curiosity for knowing other cultures.
- Adaptation skills.
- Desire to travel.
- Resolution capacity.
- Cooperative working skills.
- Leadership capacity.

As a result of these findings, some strategies for the development of skills for work in secondary education and higher education are evident as policy implications. For example, Mourshed et al. [32] point out the acquisition of skills for employment from lower stages, highlighting the importance of working in decision-making to favour employment engagement, the transmission of real success stories for the development of the problem solving capacity, to improve access to information, to favour social skills and adaptability through practical and real situations, to make the educational system more comfortable or give support for access to the university among others. In relation to higher education, Cassidy [33] and Wilton [34] establish the interest of emphasizing the learning process and not evaluation, the development of a sense of responsibility, peer support and evaluation, the promotion of teamwork through effective leadership, or the improvement of creativity and entrepreneurial spirit through innovative proposals. For all this, it is necessary to modify traditional practices in university education by transforming the organizational schemes, contents, spaces and times. In this way, higher education will be the direct way for training for employment and an indirect way for the development of professionals who generate these skills in lower stages and specific groups such as UFM.

Finally, and before to establish the main conclusion of the study, it is interesting to know the main limitations of it. First, it should be noted the design developed, because being a cross-sectional study is not allowed to establish causal relationships between variables. Another limitation could be the age range of the study sample, which is relatively broad in order to consider a representative sample. However, the UFM do not show great differences in their skills for work according to this variable due to their short time of schooling, which makes it a salvageable limitation. Finally, the last limitation lies in the developed instrument, which is based on an ad hoc version linked to the work skills identified in the Future Skills 2020 by Davies et al. [12]. Therefore, two important future perspectives are proposed to continue this line of research. The first is associated with the analysis of the psychometric properties of the instrument developed from this pilot study, specifically in the UFM collective and other populations. The second line of research arises from the applicability of this instrument not only to undergraduate students, but also to university students who have completed their professional degrees, since this instrument could be applied in higher education. In fact, the interest of this instrument lies in its applicability to the diagnosis of needs related to deficits in skills for employment, which would identify which skills should be worked to promote success in work contexts.

From these findings, we can accept our initial hypothesis and consider that the degree of acquisition of skills for future working in a Smart City is linked with the state of schooling, incorporation of the young person into the workplace and educational level [35]. The need exists to consider these aspects when planning the training of UFM for the development of competencies and skills which will enable them to adapt to their host context at the educational and socio-labour level. These FWS are necessary to enable the filtering of information (face-to-face and virtual context), to prepare individuals to become

leaders and to work in a team, to promote critical thinking, and to develop emotional intelligence skills. Through this, UFM groups will increase their likelihood of achieving employment in the closest European context as described by HORIZON 2020 and from learnings taken from emerging theories in the Digital Era [36], Anytime and Anywhere [37], and Invisible Learning [38].

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## Appendix A

**Table A1. Situation 1:** Imagine that you are presenting work in class to all of your colleagues. How would you rate your ability to make sense?

Skill Making Sense	Rating Scale	Description
<b>Description:</b> Ability to determine the deep meaning or significance of what is being expressed.	20–18	I have explanatory clarity at the time of presenting my topic; every now and then I give examples so that the explication is better understood; I am even able to compare with theory and go back to the central topic, maintaining appropriate composure and raising questions to address possible doubts.
	17–14	I am focused on my topic and I communicate well but I do not give examples.
	13–11	Every now and then I have to look at some notes to keep control of my topic and be able to follow the presentation well.
	10–00	I do not understand what I am presenting, for this reason I always have to read, being incapable of giving my own examples and not being focused on the topic.



**Table A2. Situation 2:** Imagine that a colleague asks you to pass them your notes because they didn't feel like going to class the previous day. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Social intelligence:</b> Ability to connect with others in a deep and direct way, to perceive and stimulate the desired reactions and interactions.	20–18	I urge them to reconsider the consequences of their unjustified absence in class and their consideration of the pertinence of taking my notes. I propose that it is a lack of respect towards the rest of the classmates.
	17–14	I lend them the notes but I tell them that the next time I will not do it, given that it is not ok to take advantage of the efforts of others without having a stronger reason.
	13–11	I lend them the notes although I do not want to; I do not like that others take advantage of my work.
	10–00	I do not lend them the notes because they do not deserve them. It's every man for himself.



**Table A3. Situation 3:** Imagine that you have forgotten to take your notes to class and the teacher is explaining something important based on these and asks you for a question or comment. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Novel and adaptive thinking:</b> Ability to think and form responses beyond that which is purely memorised or based on norms.	20–18	I am capable of keeping up with the pace of the class even without having the theory. For this reason, I answer with ease and with a great capacity of imagination.
	17–14	I give the most appropriate answer possible and I attempt to handle the topic with the knowledge I already have.
	13–11	I try to give an answer even when I know that it does not address the proposed question.
	10–00	I do not know how to answer because, without having the theory, I do not feel at ease and I am not able to give a creative answer, nor to carry the topic forward.



**Table A4. Situation 4:** Imagine that a new classmate arrives to class and asks that you work together to accomplish future work. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Cultural:</b> Ability to operate in different cultures	20–18	I have no problem because I would want them to accept me too, besides in this way I can learn a little bit about their culture and language and can get a collaborative piece of work out of it.
	17–14	The idea pleases me, however I think that it would be too costly to my time to complete the work.
	13–11	I tell them that I am not very convinced because I think that their culture and language is not going to facilitate the work. In the end it's possible that we will not adapt.
	10–00	I would say no because we do not speak the same language and I do not understand their culture, for this reason it would be much more difficult to complete the work and we would not end up adapting.



**Table A5. Situation 5:** Imagine that they ask you to complete a piece of work in class and they do not give you guidance references. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Computational thinking:</b> Ability to translate immense quantities of data into abstract concepts and to understand the reasoning based on large volumes of information.	20–18	I locate keywords in order to conduct a general Internet search, from the first readings I make my outline and I delve deeper into the relevant points in order to inter-relate them.
	17–14	I know what I want to search for and afterwards I go summarising and ordering.
	13–11	First I search all of the information and then I go ordering according to points or themes.
	10–00	I start to search for information on the Internet and I go writing everything that occurs to me. I then organise the content at the end.

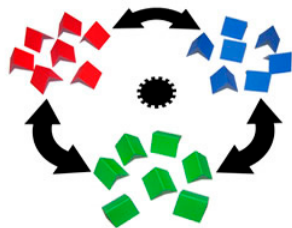
**Table A6. Situation 6:** Imagine that you have to complete group work with your classmates and each one is charged with completing a section. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Command of new media:</b> Ability to critically evaluate and develop content that is used by new media and build up this media for persuasive communication.	20–18	I urge my classmates for us to organise ourselves. I desire that the final work has the coherence and cohesion that it should have, for this reason I propose to them that we use the same programs and the same sources.
	17–14	I suggest that we could work with program X in order to organise and share information in real-time, but my idea does not go ahead because the majority prefer to follow a more traditional method.
	13–11	I do the part that they have given me and I ask about the doubts that I have; I present it as and when my classmates tell me to.
	10–00	I limit myself to do the part that I am given, trying to meet the deadlines they have given me.



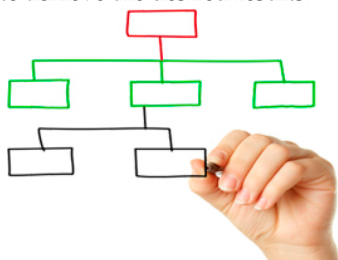
**Table A7. Situation 7:** Imagine that you have to analyse a specific situation where the qualities of the individuals participating in the work that you have to do appear and, further, you must present the results in a numeric way. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Integration of disciplines:</b> Knowledge and ability for understanding concepts through multiple disciplines.	20–18	I would be capable of introducing the data into a computer program and would even be able to analyse the information.
	17–14	I insert the data into a computer program, but I would find it difficult to analyse the information.
	13–11	I would only be able to introduce the data into a computer program.
	10–00	I would not be able to manage with any computer program, better with paper.



**Table A8. Situation 8:** Imagine that you find yourself at the start of a piece of classwork, you have collected a large quantity of information and you have a meeting with the tutor. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Design mentality:</b> Ability to present and develop work tasks and processes in order to achieve the desired results.	20–18	I go to the tutorial with all of my information and the most interesting points ordered, and above all with possible doubts well outlined so that everything is clearer.
	17–14	I introduce all of the collected information in an ordered fashion, but not according to themes and without knowing well where each bit fits best.
	13–11	I introduce all of the information but only halfway, given that there are parts that I know how to organise and others that I do not.
	10–00	I do not know how to organise this information and so I present everything I have without any established outline.



**Table A9. Situation 9:** Imagine that you have to complete a piece of classwork performing an exhaustive search of different sources. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Intellect management:</b> Ability to discriminate between and filter relevant information, and to understand how to maximise comprehension.	20–18	I am capable of searching within diverse sources and filtering only that information that is most relevant for my work, in this way having greater clarity and specificity.
	17–14	I perform a search of different sources but I am not capable of filtering to get to only the relevant information.
	13–11	I search within only a few sources and I collect everything I find that speaks to or has something to do with my topic.
	10–00	I put all of the information that I have found, even that which has little to do with the topic of my work in order to get maximum comprehension.

**Table A10. Situation 10:** Imagine that a classmate is undertaking a piece of work that is similar to yours and your tutors propose that you work together in a virtual way. How would you rate your ability to?

Skill	Rating Scale	Description
<b>Virtual collaboration:</b> Ability to work productively, to provoke involvement and to demonstrate presence as a member of a virtual team.	20–18	The idea of comparing information relating to my work in a virtual way excites me and I have no problem communicating through the Internet.
	17–14	I do not mind doing it because I am used to handling New Technologies, however I would prefer to do it face-to-face.
	13–11	It does not please me to do distance working because it is more difficult to work via digital communication.
	10–00	I consider that in order to complete a good piece of work as a team we should be physically present; virtual communication is not a good resource for carrying out a good piece of work.



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