

Validation of a Scale Measuring Future Work Skills in Unaccompanied Foreign Minors: An Exploratory and Confirmatory Analysis

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Abstract

Objectives: Unaccompanied foreign minors (UFM) represent a sector with great educational needs that requires the development of a series of skills to engage effectively in future work and enable their inclusion within a modern and digitized society. The objective of the present study is to validate a scale designed to measure the skills for future work of a representative sample of UFM in southern Spain (n=390). All participants came from the Temporary Relocation Centre for Vulnerable Groups. **Methodology:** A quantitative, exploratory, cross-sectional and ex post facto study was carried out. FACTOR Analysis® 9.3.1 software and IBM Amos Graphics® 23.0 were used for data analysis. **Results:** A one-dimensional scale comprising ten skill indicators was developed and produced good fit indices [$p < 0.001$; KMO = 0.794; GFI = 0.92; AGFI = 0.90; SMSR = 0.046]. Likewise, confirmatory analysis identified items 3 [innovative thinking] and 8 [design mentality] to be the most relevant skills for future work in this group, with item 1 [ability to find meaning] producing the lowest regression weight making it the least relevant. **Conclusions:** A reliable and robust scale was produced for assessment of the essential skills needed in the educational and work context in a population at risk of exclusion, namely, unaccompanied foreign minors. This instrument will make it possible to conduct preliminary diagnoses and better target the specific needs of this group.

Keywords: Foreign student; Centre for the protection of minors; Education and training; Ability; Information skills; Employment.

INTRODUCTION

The European working world fluctuates due to the emergence of new social challenges that generate the need for changes in the foundations of employment. This reality clearly demonstrates the need to examine whether training provision meets the demands of the current job market (Ashton et al., 2016; Callaghan, 2018). A number of reasons exist for this, of which, it serves to highlight, that if training is not targeted towards social demands

and individual characteristics, or is not permeable to the aforementioned fluctuations, it can lead to serious risk of social-occupational exclusion. Such risk is linked to the lack of access, within young people, to the essential skills required for them to function, in their adult life, in future society (Arnau-Sabatés et al., 2014; Nos et al., 2019). In fact, the report titled “Future Work Skills 2020”, produced by the University of Phoenix (Davies et al., 2011; Olmedo-Moreno et al., 2022), outlines ten skills that all young people leaving the

educational system must acquire in order to achieve success in the current job market.

Adolescents who are currently studying at educational centres must develop these skills or, at least, be aware of the importance that they will have in the working world they will one day join (Arnau-Sabatés et al., 2015). The issue resides in the fact that the educational system is not currently capable of effectively executing the basic actions required to successfully develop all of these abilities and skills in its students, let alone the ideal interaction between them (Brunello & Schlotter, 2011; Holtmann et al., 2017). Based on that discussed above, the development of actions is vitally important to achieve these objectives through basic, middle and higher education. It will be vital to achieve confluence and good development of abilities based on the assignment of meaning, social and transcultural intelligence, and the mastery of new technology, as this will enable real improvements in the inclusion of students in the working world and support lifelong learning (Jackson, 2015; Losada-Puente et al., 2022). Based on this premise, the situation at hand is even more serious when it concerns socially excluded young people (Rania et al., 2018), with one of the most vulnerable groups, in this regard, being unaccompanied foreign minors (hereon, UFM).

The European Union acknowledges that the integration of those who immigrate is the only route towards guaranteeing economic and social cohesion in a Europe in which the number of individuals immigrating grows with every passing day. It is hoped that, in this way, the social marginalisation of these individuals will be avoided (Allsopp & Chase, 2019). UFM's reflect a reality that persists between Europe and its neighbouring countries, especially in the south, with this being one of the most unequal borders in the world. Europe continues to be the "golden dream" for many young people faced with a lack of opportunity and an uncertain future in their home countries. The reality lived by these minors leads them to set out on migratory journeys alone. These individuals do not make up a homogenous group, instead each UFM is faced with

different circumstances and has a different education background and dream to chase that leads them to embark on this adventure (Perazzo & Zuppiroli, 2018; Rania et al., 2018). Nonetheless, all of these individuals do share something in common; their immediate lifegoal is to join the job market, as a means to converting themselves indefinitely into European citizens and, from this set up, help their families with the precarious situation they face in their home countries (Ferrara et al., 2016; Quintas-Quintas et al., 2022). The migratory journey on which these young people set out on, with the full support of their families, is initiated with the eventual goal of finding work. Thus, key to the integration process experienced by these young people is work and education. This point is highlighted by Allsopp & Chase (2019) and Rania et al. (2018).

A misalignment exists between the problems detected in these young people, the provision of resources and their needs, given that, sometimes, there is a failure to consider the cultural change, their illegitimate status and the loneliness they face due to finding themselves far from their family nucleus (Mora-Olate, 2021; Pérez & Salgado, 2019). Interventions for these minors cannot be based on the traditional socio-educational model. Instead, plans to intervene must be tailored towards the shared expectation of joining the working world as soon as possible. For this reason, identification of the individual skills that will support future occupational insertion must be the bedrock of intervention programs, which will likely have more success should they emphasise these skills individually (García-Garnica et al., 2021).

The present study seeks to construct and validate a scale to measure skills for future work. This scale will be used to measure the extent to which UFM have acquired the ten abilities identified as determinants of the working future of young people in the European Union. In this way, more effective diagnostics will be able to be performed, which will enable the pertinent social-educational adaptations to be made. This will facilitate the development of skills and abilities for a

working future, leading to greater long-term inclusion and better insertion in society and the working world.

MATERIAL AND METHOD

2.1. Methodological design

A quantitative, descriptive, cross-sectional and ex post facto study is presented, which performed a single measurement within a single group. An analysis was conducted of the psychometric properties of the developed scale when used within a specific population, via exploratory and confirmatory factor analysis.

2.2. Sample and sampling

The sample was selected via proportional stratified sampling, as a function of the time in which participating unaccompanied foreign minors had been in their host country in the south of Spain (less than nine months and more than nine months). This period of time was selected as it corresponds with a time-period in which minors have finished the initial and educational development phases at the Temporary Relocation Centre for Vulnerable Groups (Spain). These phases last for at least one month and tend to last for around nine months. During this period the minor manages to fully adapt to the educational group and the centre, place focus on their situation regarding their studies, family and health, amongst other aspects. This enables an Individualised Educational Plan to be developed, in compliance with the norms and objectives proposed by the institution with respect to the minor (hygiene habits, behaviour at the centre). Further, this also allows the training and/or occupational learning process to be developed in line with their needs and individual resources, whilst strengthening their relationships with social support networks (school, friends, etc) and helping them take responsibility for their own educational program. A total of 340 participants were selected who met the characteristics previously indicated. A confidence level of 0.01 was set for this sample, with an accuracy (d) of 3% and proportion of 5%. Of the total sample of

minors, 63.4% belonged to the group who had spent less than 9 months at the centre, whilst 36.6% had spent more than 9 months at the centre.

2.3. Instruments

The Future Work Skills Scale (FWSS) was based on the premises established by Davies et al. (2011). The scale contains 10 items that address 10 basic abilities required for successful insertion in the workplace and consider the following:

1. Meaning attribution: the capacity to determine the deeper meaning or significance of what is being expressed.
2. Social intelligence: the capacity to connect with others directly and on a deeper level in order to feel and stimulate desired reactions and interactions.
3. Original and adaptive thinking: sufficiency in thinking and ability to come up with solutions and responses beyond those that are standard or prescribed.
4. Transcultural competence: capacity to function in different cultural contexts.
5. Computational thinking: capacity to translate large amounts of data into abstract concepts and to understand data-based reasoning.
6. New media literacy: ability to critically evaluate and develop content that uses new forms of communication media and use this media as a level for persuasive communication.
7. Transdisciplinarity: literacy in and ability to understand concepts used across multiple different disciplines.
8. Sculpted way of thinking: ability to represent and perform work tasks and processes in order to achieve desired outcomes.
9. Cognitive load management: capacity to discriminate and filter information by the order of importance and understand how best to utilise cognitive functioning through a variety of tools and techniques.

10. Virtual collaboration: capacity to work productively, direct management and demonstrate presence as a member of a virtual team.

This descriptive scale was constructed with the help of a panel of five experts who applied a Delphi technique comprised of two rounds. During the first meeting, 20 descriptive levels were outlined pertaining to the use and acquisition of each of the abilities making up the scale. During the second meeting, these levels were condensed into four groups. The first groups comprised 11 descriptions pertaining to use, which described inadequate acquisition of the ability. The second group comprised 3 descriptions pertaining to adequate acquisition. The third group comprised 4 descriptions pertaining to a high level of acquisition. Finally, the fourth group comprised 3 descriptions pertaining to excellent acquisition of the ability.

2.4. Variables

The following variables were considered in the present research work:

- Length of time spent living in Spain: this variable was captured in a nominal and dichotomous way, as a function of two categories, namely, less than nine months and more than nine months (time in which the minor finishes initial and educational development stages at the Temporary Relocation Centre).
- Future work skills: this variable was defined based on the sum of the 10 indicators comprised by the FWSS. At the same time, this variable is composed of 10 variables measured on an ordinal scale, each of which is associated with one of the future work skills described in the instruments section.

2.5. Procedure

Firstly, directors of the various participating centres for unaccompanied foreign minors in the south of Spain were contacted via an information pack developed by the principal investigator (PI) attached to the present project. This information pack outlined the nature of the study, its objectives and the way in which data

was to be handled. Once approval was received from centre management, the aforementioned scales were administered in-person at the centres. Data collection was conducted, at all times, with the presence of a researcher connected to the project, alongside one or more centre staff members. The aim of this was to ensure the correct completion of scales and resolve any doubts. This process transpired without any incident.

It serves to highlight that participant anonymity was ensured at all times, with scales being completed individually, anonymously and with respect for the rights of participants rights to confidentiality. The present work adhered to the ethical principles established by the Declaration of Helsinki (1975), later updated in Brazil. Likewise, the present research is derived from outcomes obtained from an R+D project (reference number: PID2020.119194RB.I00). This research project received a positive evaluation from the Ethical Committee of the University of Granada (reference number: 1678/CEIH/2020).

2.6. Data analysis

Basic descriptive data (means, asymmetry, variance and kurtosis) were analysed using version 22.0 of IBM SPSS® software (George & Mallery, 2003). Exploratory factor analysis (EFA) was performed using FACTOR Analysis® 9.3.1 software (Lorenzo-Seva, & Ferrando, 2006), employing principal components analysis with varimax rotation. Reliability of the overall scale and its respective obtained factors was determined in accordance with Cronbach alpha coefficients, with the reliability index being set at 95%. Finally, the program IBM Amos Graphics® was used to conduct confirmatory factor analysis (CFA). Goodness of fit was determined based on goodness of fit criteria established by Kock (2014). With regards to Chi/squared, non-significant p-values indicate good model fit. Comparative fit indices (CFI) are considered acceptable when they are higher than 0.80 and excellent when higher than 0.90. The normalised fit index (NFI) must be higher than 0.80. Incremental fit values (IFI) are considered to be acceptable when they are

higher than 0.80 and excellent when they are higher than 0.90. Finally, root mean square error of approximation (RMSEA) values are considered to be excellent when they are lower than 0.08. Prediction error terms were associated with the observed variables. Parameter estimations were made using the maximum likelihood (ML) method as this is coherent, unbiased and not affected by scale type.

RESULTS

Table 1 presents the descriptive analysis of the different items comprising the questionnaire designed to future work skills based on the dimensions conceived by Davies et al. (2011). Dispersion tests were conducted, including asymmetry and kurtosis, with the aim of establishing whether data followed a normal distribution. Based on this, no item was initially discarded, as outcomes for all of the aforementioned statistical tests were lower than 2, in accordance with that outlined by Hu & Bentler (1998) and Schmider et al. (2010).

Table 1. *Descriptive analysis of the future work skills scale*

Items	Mean	CI (95%)	Variance	Asymmetry	Kurtosis
<i>I.1. Ability to find meaning</i>	14.087	[13.59-14.59]	13.149	0.192	-0.675
<i>I.2. Social intelligence</i>	13.387	[12.89-13.88]	12.784	0.494	-0.462
<i>I.3. Novel and adaptable thinking</i>	14.108	[13.63-14.59]	12.148	0.113	-0.538
<i>I.4. Culturality</i>	13.398	[12.82-13.97]	17.338	0.525	-1.084
<i>I.5. Computational thinking</i>	14.270	[13.73-14.81]	15.465	0.146	-1.035
<i>I.6. Mastery of new media</i>	13.276	[12.78-13.77]	12.903	0.484	-0.566
<i>I.7. Integration of disciplines</i>	13.578	[13.04-14.11]	14.953	0.445	-0.841
<i>I.8. Design mentality</i>	12.948	[12.46-13.43]	12.334	0.648	-0.307
<i>I.9. Management of understanding</i>	12.927	[12.44-13.41]	12.434	0.640	-0.361
<i>I.10. Virtual collaboration</i>	13.837	[13.26-14.41]	17.148	0.368	-1.141

Table 2 reveals the psychometric properties of the 10-item scale measuring future work skills, as established via development of a rotated factor matrix and factor loadings using the program FACTOR Analysis® 9.3.1. (Lorenzo-Seva & Ferrando, 2006). The Bartlett statistic revealed acceptable fit [426.3; df = 45; $p < 0.001$], whilst the value produced from the Kaiser-Meyer-Olkin (KMO) test was acceptable [KMO = 0.794]. Likewise, the single-factor solution produced explained 35.84% of variance, which is an acceptable proportion for this type of work. Further, other fit indices were examined with the aim of establishing the reliability of the analyses performed. The comparative fit index (CFI) was acceptable, with a value of 0.89, whilst goodness of fit (GFI) and adjusted goodness of fit (AGFI) indices were also acceptable, being 0.92 and 0.90, respectively. Similarly, the root mean square error (RMSE) value was 0.046, representing excellent fit. Thus, based on these fit indices, it can be concluded that there was a good fit of the items making up the model

Table 2. *Rotated factor matrix and factor loadings*

Item	Factor loading
<i>I.1. Ability to find meaning</i>	0.310
<i>I.2. Social intelligence</i>	0.427
<i>I.3. Novel and adaptive thinking</i>	0.644
<i>I.4. Culturality</i>	0.518
<i>I.5. Computational thinking</i>	0.593
<i>I.6. Mastery of new media</i>	0.554
<i>I.7. Integration of disciplines</i>	0.511
<i>I.8. Design mentality</i>	0.600
<i>I.9. Management of understanding</i>	0.488
<i>I.10. Virtual collaboration</i>	0.346
Internal consistency of the scale	$\alpha = 0.730$

The final scale was made up of a single factor that was determined in accordance with existing literature and the fit indices produced by statistical software (Factor 1 = future work skills). The scale comprised 10 items [I.1; I.2; I.3; I.4; I.5; I.6; I.7; I.8; I.9; I.10]. In this sense, all 10 items that made up the initial scale were retained given that they produced coefficients greater than 0.300 (Hu & Bentler, 1998; Lorenzo-Seva & Ferrando, 2006). Following this, internal consistency of the overall scale was examined according to Cronbach alpha

coefficients, with acceptable values being produced [$\alpha = 0.730$] (Table 2).

Next, with the aim of verifying the outcomes produced by the preliminary exploratory factor analysis, confirmatory factor analysis was conducted via the development of a structural equation model (SEM). This model encompassed the previously obtained factor as a latent variable and the different associated items as observed variables. With regards to the fit indices for the developed structural model, the Chi-squared statistic was found to be significant [$X^2 = 78.692$; $df = 35$; $p < 0.001$]. Nonetheless, Chi-squared values are highly sensitive to sample size. For this reason, it was decided to employ other fit indices with the aim of examining the model. In this sense, normalised fit (NFI), incremental fit (IFI) and comparative fit (CFI) indices were all acceptable (NFI = 0.799; IFI = 0.868; CFI =

0.864). Likewise, the root mean square error of approximation (RMSEA) value was 0.060, with this being acceptable according to Kock (2014).

In this regard, Table 3 and Figure 1 present the standardised regression weights produced for the relationships between the global factor and its indicators for the proposed structural model. In all cases, these outcomes were positive and significant ($p < 0.05$). In this way, it can be observed that the indicators to exert the greatest influence over the global dimension are item 3 (novel and adaptive thinking) ($b = 0.573$; $p < 0.005$), item 8 (design mentality) ($b = 0.511$; $p < 0.005$) and item 5 (computational thinking) ($b = 0.503$; $p < 0.005$). In contrast, the items found to exert the least influence due to their lower regression weights were item 1 (ability to find meaning) ($b = 0.228$; $p < 0.01$) and item 10 (virtual collaboration) ($b = 0.251$; $p < 0.01$).

Table 3. *Standardised regression weights produced for the scale model*

Association between the factor and its items			RW			SRW	
			Estimation	EE	CR	p	Estimation
I.1	←	F: Skills	1.000	-	-	***	0.228
I.2	←	F: Skill	1.511	0.498	3.036	**	0.349
I.3	←	F: Skills	2.420	0.715	3.383	***	0.573
I.4	←	F: Skills	2.193	0.682	3.216	***	0.431
I.5	←	F: Skills	2.404	0.725	3.316	***	0.503
I.6	←	F: Skills	2.037	0.623	3.269	***	0.466
I.7	←	F: Skills	1.932	0.608	3.177	***	0.410
I.8	←	F: Skills	2.187	0.658	3.325	***	0.511
I.9	←	F: Skills	1.673	0.533	3.135	**	0.389
I.10	←	F: Skills	1.268	0.475	2.671	**	0.251

Note 1: RW, regression weight; SRW, standardised regression weight; EE, estimated error; CR, critical ratio

Note 2: **, statistically significant differences at the level of $p < 0.01$; ***, statistically significant differences at the level $p < 0.005$.

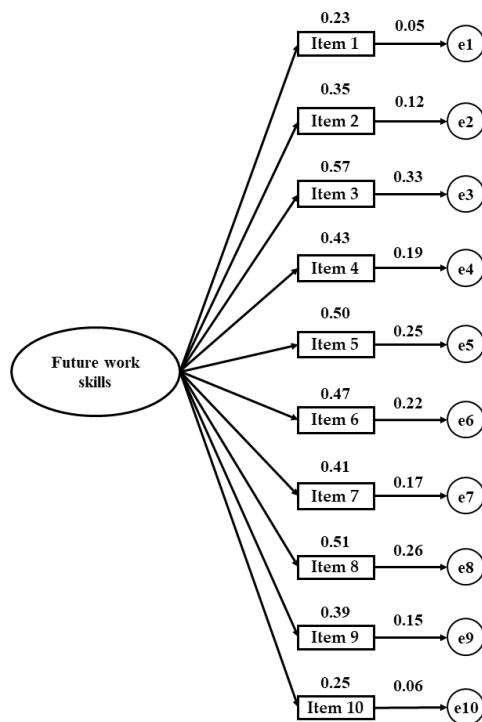


Figure 1. *Structural model for confirmatory analysis*

DISCUSSION AND CONCLUSIONS

The present research work sought to analyse, through exploratory factor analysis, the psychometric properties of a future work skills scale when administered to unaccompanied foreign minors living in the south of Spain. This proposal was based on principles presented by Davies et al. (2011) regarding future work skills in Horizon 2020 and a pilot study conducted by Expósito et al. (2019), in which preliminary descriptive analysis was conducted based on sociodemographic and academic factors. Likewise, confirmatory factor analysis was carried out via a structural equation model that grouped the 10 items of the questionnaire together as observed variables within a single factor that comprised the endogenous variable. Thus, the present study addressed the validation of an instrument in a similar way to work conducted by Maggiori et al. (2017), Martínez-Martínez et al. (2019), Montero-Fernández et al. (2022), Morales-Baños et al. (2023), Rania et al. (2014) and Rodríguez-Pérez et al. (2021).

With regards to the exploratory factor analysis, administration of the future work skills scale within the study sample did not lead to the removal of a single item based on the basic descriptive data produced, in terms of asymmetry, variance and kurtosis values, and recommendations provided by Kock (2014) and Byrne (2016). Likewise, whilst the proportion of explained variance was on the low side, with the value being around 40%, such outcomes are acceptable according to George & Mallery (2003). Factor loadings produced for the single-factor solution based on principal components analysis were acceptable in all cases, with all values being higher than 0.300. For this reason, it was necessary to remove any item from the final scale (Lorenzo-Seva & Ferrando, 2006). Moving on to consider outcomes produced from confirmatory factor analysis of the factors outlined through exploratory factor analysis, it can be seen that acceptable fit indices were produced in line with guidelines provided by Kock (2014). This demonstrates that the developed structural model is suitable for measuring the 10 variables considered to represent the single global dimension comprising future work skills.

When considering the influence exerted by the different items of the global dimension, it can be seen that the largest regression weight pertains to novel and adaptive thinking. According to Davies et al. (2011) and Expósito et al. (2019), this ability refers to the capacity of minors to cope with academic and/or occupational situations that require improvisation and imagination. This ability also refers to the ability to adapt to new requirements that call for a non-automated response. It is evident that this variable succeeds in reflecting this quality in the context of the global factor pertaining to future work skills. Indeed, Jackson (2015) highlights some of the main abilities required for work, with problem-solving capacity, critical thinking and having a large capacity for initiative being essentially factors for this type of novel and adaptive thinking. Likewise, Kivunja (2015) emphasises the importance of developing abilities related with initiative and self-direction, in addition to flexibility and

adaptability. Such conclusions are also supported by work conducted by García-Garnica et al. (2021) and Olmedo-Moreno et al. (2022).

Relatively large regression weights were also produced for design mentality (associated with the capacity to execute a series of actions to achieve desired outcomes) (Expósito et al., 2019) and computational thinking (linked with the ability to organise, synthesis and utilise large quantities of information) (Davies et al., 2011). Specifically, an array of studies can be found that show the importance of these abilities in the workplace (Clark-Kasimu, 2015; Jackson, 2015) and, more concretely, in the academic setting (Drew, 2018; Suleman, 2018). In fact, it would make sense for these two abilities to acquire greater importance in unaccompanied foreign minors, given that they are faced with the need to master a new language and tackle different cultural and social dynamics, whilst also requiring training, upskilling and occupational guidance. All of the aforementioned means that these minors must master and organise an incredibly large amount of information (Fulantelli et al., 2019; Piazza et al., 2017; Rania et al., 2014).

In contrast, items with lower regression weights and, therefore, less influence on future work skills in unaccompanied foreign minors corresponded to the ability to find meaning (being able to understand the meaning of an element in depth) and virtual collaboration (the ability to work productively through networks with peers or colleagues) (Davies et al., 2011; Expósito et al., 2019). It is logical that these two variables are less influential within the group under study for a number of reasons. Firstly, their inferior mastery of the local language and knowledge of the culture will lead to lower understanding of the meaning of the tasks to be performed, meaning that this will be less influential when it comes to appraisals of their global abilities (Evans et al., 2018; Martínez-Martínez et al., 2019). On the other hand, reference is made to unaccompanied foreign minors, without financial resources and who, as a general rule, reside in reception facilities. For these reasons, these young people do not have the digital

resources required to develop skills linked to virtual collaboration, nor can they gain the knowledge needed to develop the basic digital skills required to engage properly in such collaboration (Fulantelli et al., 2019, Kutscher & Kreß, 2018; Parra-González et al., 2021).

Finally, it is of particular importance to outline the main limitations presented by the present research work. The first such limitation is found in the sample used, which is somewhat smaller than those typically used in studies validating data collection instruments. Nonetheless, it serves to highlight that the number of unaccompanied foreign minors that made up the main body of the work represents a representative sample with regards to the overall number of residents in the bordering cities of Ceuta and Melilla (Spain), with this number rising all the time. Secondly, it served to mention the low mastery of the Spanish language in participants of the present study. This may have led to understanding errors in relation to the items making up the questionnaire, reducing the corresponding reliability coefficients and internal reliability. Based on this, there is a clear need to conduct a validation study of the school self-efficacy scale within this group of individuals.

Finally, as main conclusions of the present study, it serves to highlight that the present study contributes to existing literature by adapting the future work skills scale for use within a sample of unaccompanied foreign minors living in Spain, with both exploratory and confirmatory analysis producing good fit indices. Validation outcomes support retention of the 10 original scale items, grouping them into a single dimension (future work skills) and producing acceptable kurtosis, asymmetry and variance values, in addition to acceptable KMO, Cronbach alpha, CFI and GFI coefficients. It serves to highlight that the indicators with the greatest influence over the global dimension were novel and adaptive thinking, design mentality and computational thinking, whilst abilities pertaining to finding meaning and virtual collaboration were the least influential in this regard. Thus, a suitable, reliable and robust scale is provided for evaluation of abilities that are supremely useful

in the educational and occupational context in a population, namely, unaccompanied foreign minors, that is at risk of exclusion.

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[Transformation of learning in hybrid contexts for the educational and labor inclusion of especially vulnerable sectors with an emphasis on UFM - Transformación de los aprendizajes en contextos híbridos para la inclusión educativa y laboral de sectores especialmente vulnerables con énfasis en MENAS].

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