IRA-International Journal of Education & Multidisciplinary Studies
ISSN 2455–2526; Vol.20, Issue 03 (Q3, 2024)
Pg. no. 220-235.
IRA Academico Research

Adaptations in Vocational Guidance: Experience from the Colombian Amazon

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Type of Work: Peer Reviewed.
DOI: https://dx.doi.org/10.21013/jems.v20.n3.p6

Review history: Submitted: July 05, 2024; Revised: August 12, 2024; Accepted: August 23, 2024

How to cite this paper:
Torres-Reyes, A. M. (2024). Adaptations in Vocational Guidance: Experience from the Colombian Amazon. IRA-*International Journal of Education & Multidisciplinary Studies* (ISSN 2455-2526), 20(3), 220-235. https://dx.doi.org/10.21013/jems.v20.n3.p6

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ABSTRACT

As we move into late postmodernity, the instruments and processes proposed require research and development processes that allow them to remain in force within current technological mediations and trends. In this context, the instruments that facilitate vocational guidance processes are included. Therefore, this innovation experience arises as a response to the needs present in the Colombian context, based on two objectives: To reduce the number of items in the CHASIDE vocational orientation test, 2) To validate the resulting test. A longitudinal study with a quantitative approach was carried out, with a convenience sampling in three Colombian municipalities during 2019-2023. Quantitative statistical analysis techniques, data were analyzed including statistics of mean, variance, Pearson's correlation coefficient, hypothetical difference of means, degrees of freedom, t-statistic, P(t) and critical value of t (one tail and two tails), and others. Additionally, internal consistency was checked using Cronbach's Alpha. Managing to reduce the test from 98 items to 35 items, preserving its two dimensions (Aptitudes and Interests), with a simpler structure, which responds to a Multifactorial Profile (PM), its validation confirmed the new structure, that established 7 factors for the dimension of aptitudes, constituted by 27 items and 3 factors for the Interests dimension with 8 items. In conclusion, social changes are reflected in factor structures and their groupings within professions, leaving the unifactorial proposed by Holland in the RIASEC, to give way to interactions within aptitudes and interests. Aptitudes being more stable than interests over time.

Keywords: Vocational choice; Vocational guidance; Research and development; Technology, Vocational Orientation Test

Introduction

As we advance in the acceleration of time or, if you prefer, in the temporal distortion (Han, 2021a) typical of late postmodernity, all the processes and instruments proposed in previous eras are obliged to carry out research and development processes that allow them to transform themselves to adapt to societies that require rapid integration of change. In this context, psychometrics, as a basic area for measuring and quantifying human behavior in general, has made efforts over time to improve the processes that complement activities, including those related to vocational and professional guidance processes (Domenico & Vilanova, 2000).

In the case of vocational guidance, there are studies that establish a positive relationship between participation in vocational guidance processes and: a) a decrease in school dropout processes (Ministry of National Education, Colombia, 2022) improvement in school success (Martínez, 2017; Rojas & Rubio, 2017), in the same way, vocational and professional guidance accompanies the beginnings of recognition of Psychology as a discipline independent of medicine.

1. Vocational Guidance in Colombia

In the case of Colombia, psychometrics is linked to the emergence of the first psychology faculty in the country and in all of Latin America (Torres, 2024), which has its peak precisely within the educational scenario in order to support the processes of access to university, which was later extended to other educational and productive institutions (Ardila, 1998).

Specifically, in vocational guidance, the first regulation was presented in 1954, allowing the creation of six Institutes of Psychological Studies and Professional Guidance (Ministry of National

Education, Colombia, 1954), from that date a process began that included the creation of other institutions, changes in the denominations, assignment of specific functions such as the study and analysis of the survey carried out on Baccalaureates on their professional choice (Ministry of National Education, Colombia, 1958) or the formulation of guidance programs for secondary schools, among others (Ministry of National Education, Colombia, 1960).

After this process, a stage of qualification begins through university training, (an example of this is the Bachelor's Degree in Psychology and School Counseling and others, in an effort to reduce school dropout and improve school processes), which implied a demarcation of what to do professionally in context, granting functions related to attention to challenges such as school coexistence, Education for sexuality and the prevention of school violence (Ministry of National Education, Colombia, 2013), which led to a new restructuring of what to do that has been nurtured with new functions such as the implementation of schools for parents and caregivers (Ministry of National Education, Colombia, 2020).

As for the incorporation of the vocational orientation test in the current regulation, it is mentioned within the stage of preadolescence and adolescence, taking into account the academic aspect (Ministry of National Education, Colombia, 2021). Although it is important to clarify that in Colombia school guidance goes beyond the decision-making process in processes of articulation within the levels of training, since its mission is:

> "Contribute to the socio-emotional development and exercise of the human rights of children, adolescents and young people within educational establishments, based on processes of promotion, prevention, care and monitoring" (Ministry of National Education, Colombia, 2021)

Even so, when we focus on the decision points generated by the articulation processes, which usually require specific guidance, we would find that there are decision-making processes throughout the educational process that are decisive for vocational development due to the organization of the national education system (Ministry of National Education, Colombia, 2021)

In general, the system is organized into three levels within formal education (Preschool, Basic -primary and secondary-, Secondary). However, in practice a student can choose to study in the public, private or subsidized offer. Then, because not all schools offer all levels, at each level you will have to decide again which institution you will continue your studies at. Upon completion of basic education (primary and basic secondary), the student can choose to continue with non-formal training programs (in arts or crafts), or continue to secondary education (Academic or Technical).

As for the institutions that offer academic secondary education, the regulation mentions that they organize the programming in such a way that the student can intensify in specific areas according to their interests, for example, in natural sciences, social sciences, humanities, art or foreign languages. On the other hand, technical secondary education prepares the student for job performance, incorporating theory and practice (Ministry of National Education, Colombia, 2022)

In addition to these decision-making points, there is the decision that takes place at the end of secondary education for entry into university vocational training (undergraduate) that is offered at three levels: technical, technological or university, although some higher education institutions

make use of the mechanism known as propaedeutic cycles to offer partial degrees at each of the levels.

For example, an Industrial Engineering can have partial outputs such as: Professional Technician in Production Logistics, Industrial Production Technologist, Industrial Engineer (University of Sinú, 2019), and therefore the student can advance in their studies through these partial outings that allow them to integrate into the productive system before the total completion of the program at the university level.

On the other hand, lifelong learning together with the processes of change provided by Artificial Intelligences and converging technologies, we could infer that the disruptive changes in productive forms (Bankinter Innovation Foundation, 2015) (Lee, 2019), will generate vocational guidance needs to contribute to the processes of adaptation to the transformations of the productive and educational systems.

In this sense, vocational orientation tests acquire a relevant value in the generation of data for individual and collective decision-making, however, their contribution implies adaptations to new needs and contexts.

1.1 Vocational Orientation Tests in the Latin American

Among the best-known vocational orientation tests in the Latin American context are: Kuder-C, CIPSA, CIP-4, POPA, IPP-R, SEP Vocational Orientation Test, Holland Test, validated IAMI for Orientation, with recent proposals for adaptation in the Latin American context are in processes of validation of reduced scales such as Carrasco's experience with respect to the CIP-4 (Carrasco et al., 2021). and the new scale proposed by Castro (Castro, 2022), or from Artificial Intelligence based on the POPA test (Educaweb, 2024).

However, if we take into account the general findings on psychometric instruments, they indicate that the fewer the number of items: 1) Less fatigue and more reliability (Germano & Brenlla, 2019), 2) Less possibility of generating trend biases, 3) The number of errors due to lack of completion is reduced, and 4) they tend to be better accepted.

Consequently, traditional tests have been transformed to adapt to the new context, an example of this is the Minnesota Multiphasic Personality Inventory (MMPI) which originally consisted of 567 items, and its restructured version (MMPI-2-RF) consists of 362 items, making up 50 scales with an online version of application (TEA, 2024).

1.1.1. CHASIDE Vocational Orientation Test

Specifically, the CHASIDE vocational orientation test was designed by John Holland, who developed throughout his career a theory that related the individual's personality to a certain work environment, creating different scales that would allow supporting vocational guidance processes, including the Inventory of Vocational Preferences, the Self-Directed Search Questionnaire.

His theory determined six occupational archetypes (Realistic, Investigative, Artistic, Social, Entrepreneurial and Conventional) that marked in themselves or combined individual interests. On the other hand, it established twelve Skills (Visual Motor Coordination, Social, Musical, Numerical, Abstract or Scientific, Spatial, Verbal, Mechanical, Artistic-Plastic, Executive), which were related to the occupational areas: C (Administrative and Accounting); H (Humanistic, legal sciences and social sciences); A (Artistic); S (health sciences); I (Engineers, technical careers and

computing); D (Defense and security); E (Agricultural and Natural Sciences), being one of the most influential paradigms in relation to vocational interests (Medrano et al., 2019).

In the Latin American context, its use is expanded in educational research processes, specifically in Colombia, within the last decade we find studies that address the correspondence between test results and school performance (Tamayo Lopera et al., 2018; Martínez, 2017; Rojas & Rubio, 2017), and those related to their reliability (Redondo, 2015). We find research in other countries in the region such as Ecuador (Gálvez et al., 2017; Duque et al., 2024), and Mexico (Zenteno et al., 2021)

This widespread use has led it to be part of the online vocational guidance services of different education-related institutions such as: Universidad Católica de Pereira, Colombia (Universidad Católica de Pereira, 2024), UNER of Argentina (UNER, 2021), the Mexican Association of Psychotherapy and Education (Mexican Association of Psychotherapy and Education, 2021), and Euroinnova of Peru (Euroinnova Business School de Perú, 2023), among others.

1.2. Colombian Amazon

In this sense, the study arises as a response to the need to take advantage of technological mediation to improve the coverage of the processes of applying vocational orientation tests in remote and geographically dispersed areas, such as the Colombian Amazon.

It should be noted that not all educational institutions offer secondary education, which has an impact on the levels of school dropout and the high incidence of overage students, the classrooms that group different levels, inequalities within groups, among others, mark the daily life of rural education.

The challenges observed have led to the generation of flexible pedagogical models and strategies such as: New School, Learning Acceleration, Post-Primary, Active Secondary, among others, by the National Ministry of Education of Colombia. These strategies and models have made it possible to improve the educational offer through constant adaptations. Vocational guidance is added to these challenges, being in Colombia a matter of great concern both in processes of articulation of education at its different levels and in rates of youth unemployment and unschooling, which indicate that for the range between 15-28 years of age there are 2.64 million young people who neither study nor work (DANE, 2024).

For this reason, an agreement of wills was made between a grassroots institution within the area and the researcher in order to carry out a longitudinal project that would allow generating innovations to provide technological support and in turn, enable improvement mechanisms, including the reduction of the number of items in the test.

This situation was prioritized due to the fact that problems were detected in terms of the costs of the physical application of the test (question booklets, answers, results, interpretation of the test) or the application of commercial tests, sustainability (sustained cost of replication over time), and connectivity (difficulty in maintaining connectivity contracts throughout academic periods, quality and speed of connection, difficulties in maintaining equipment and updates) and availability of devices in the area.

Therefore, this report includes two general objectives: 1) To reduce the number of items in the CHASIDE test, 2) To validate the resulting test.

2. Method

This study corresponds to a quantitative study, of a longitudinal type, since it took samples over time (Paz & Rodríguez, 2023). Statistical analysis techniques of exploratory and confirmatory factor analysis were prioritized, which are detailed below.

On the other hand, taking into account the structure of the test, it was decided to carry out a parallel analysis of the two dimensions (Aptitudes and Interests), in order to meet the proposed objectives. However, to ensure the integrity of the test, the preservation of the general internal consistency that other studies have evidenced in a Cronbach's alpha was taken into account.

To achieve the objectives, the study was divided into two stages, the initial stage (period 2019-2022), aimed to reduce the number of test items while preserving the reliability of the instrument, while the second stage corresponded to the objective of validating the resulting test (it took up the data taken during 2023).

2.1. Sample

The sample was obtained through a convenience sampling carried out in three municipalities, with the participation of students from the basic secondary and secondary education cohort and people who requested to be part of the vocational guidance process carried out by the local organization (graduates or students not linked to the educational system), during the period of 2019-2023. Over time, samples increased the reliability and validity of the sample, solving difficulties related to the requirements of factor analysis (sample size, minimum ratio per variable, and ratio of variables per factor) (Mavrou, 2015).

For the collection of the sample, authorization was previously obtained from the educational institutions and the families of the participating students, who completed the test within the facilities of the schools with the presence of teachers from the educational institutions; In addition, each student was asked for their informed consent to include the data in the study. No financial or other remuneration was offered, nor was payment received for technology support services.

The sample obtained consists of 1,055 records with a useful sample of 660 records (utility rate of 63%) due to the fact that 2% did not consent, 29% were duplicate records, 6% were incomplete. In relation to distribution, we found that 58.7% corresponded to women, 41.1% to men, and 0.2% to others. According to their socioeconomic status, the sample was distributed as follows: 81.5% belonged to stratum 1, 13.6% to stratum 2, 3% to stratum 3, 0.2% to stratum 4 and 1.7% to another stratum, the latter referring to conditions of vulnerable population in special situations such as victims of forced displacement, demobilization, among others.

Specifically, regarding the level of schooling, it is found that 1.7% corresponded to the primary level of the last grade (5), 39.7% in basic secondary school, 49.1% in secondary education, 1.5% are graduates of a post-secondary program and 8.2% at the time of application were not studying.

2.2. Instruments and/or Techniques

The research instrument was an online questionnaire that was composed of three sessions: 1) Informed consent session (it was included despite having the authorization of the educational institutions and families, out of respect for the direct participants), 2) Sociodemographic information session to characterize the sample (age, gender, educational interest, grade), 3)

Sociodemographic information session CHASIDE test consisting of 98 dichotomous items, distributed in two large dimensions: Aptitudes with 70 items (10 items for each area of knowledge), and Interests with 28 items (4 items for each area of knowledge). The reliability of the CHASIDE test from another recent study measured through Cronbach's coefficient of 0.773 (α=0.773) with a sample of 60 participants (Paz & Rodríguez, 2023)

Regarding the exploratory factor analysis of the Aptitudes dimension, the hot-deck multiple imputation method was used in the exploratory factor analysis (Lorenzo-Seva & Van Ginkel, 2016), because despite having sampled throughout the period 2019-2022, the cohorts are too small to reach larger samples; the procedure to determine the number of factors was the classic Parallel Analysis (Horn, 1965) recommended to perform exploratory analysis of principal components (Lorenzo-Seva et al., 2011), for the dispersion of the matrix accelerated Pearson correlation (Lambert et al., 1991) was used, with a confidence interval of 95%. Using as a method of factor extraction: Unweighted robust least squares and the LOSEFER empirical correction for robust Chi-square (Lorenzo-Seva & Ferrando, 2021), Robust Promin (Lorenzo-Seva & Ferrando, 2019) was calculated to calculate rotation with a weighted Varimax type intelligent rotation initiation, with estimates of factor scores based on a linear model.

For the confirmatory analysis of the structure obtained, a robust analysis of the goodness fit after the LOSSER correction (Lorenzo & Ferrando, 2023) was carried out, taking into account indicators: Minimum Chi-square of the Fit function, NNFI (Non-Normed Fit Index), CIF (Comparative Fit Index), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index) and Root of the Root Mean Square Error of Approximation (RMSEA).

Software Factor Analysis (Ferrando et al., 2022a), is a free-to-use software developed specifically in the field of psychometrics, taking into account the recommendations of Ferrando et al. (Ferrando et al., 2022b).

2.3. Procedure

The vocational orientation process included activities that followed the Colombian regulations on vocational guidance, such as: workshops with students and their families, camps and the application of the vocational orientation test, with the support of schools located in the municipalities that were part of the study, this process was led by a local grassroots organization and in that framework, only the vocational orientation process was supported in terms of technological support for the application of the test.

For which the instrument applied during the study was generated, to provide security to the data, the entry was encrypted through a website that allowed access to the questionnaire after entering the password and general unique password for the samples, which was renewed each year. In this sense, the grassroots organization managed institutional agreements, carried out authorization processes by the families, and additionally each student was asked for their informed consent to be part of the research process, this consent was collected online within the format of the CHASIDE test, and included an item with sociodemographic data to characterize the sample (age, gender, educational interest, degree).

The data obtained were returned to the base institution to continue with the vocational guidance process, and were anonymized, filtered and divided into two groups: the shots taken

between 2019 and 2022 were constituted as the basis for the reduction of the scale (n=244) and the intake taken during 2023 (n=416) was used to carry out the validation.

The reduction data were statistically analyzed according to the analysis described in the Factor Analysis software, and consistency was reviewed using Cronbach's Alpha. The validation was carried out by applying two ways of grouping: the original and the adapted version, in the case of the interest dimension it was calculated from complete items of the distribution, while the adapted one required a new factor analysis to understand the distribution of the factor loads. The total scores obtained in each dimension in both the original and adapted versions were analyzed taking into account T-student samples matched by dimension, including statistics of mean, variance, Pearson's correlation coefficient, hypothetical difference of means, degrees of freedom, t-statistic, P(t) and critical value of t (one tail and two tails). Additionally, internal consistency was checked using Cronbach's alpha

3. Results

3.1. Item Reduction

Initially, the sample was characterized by finding a large difference in the reliability of the sample as a whole of $\alpha = 0.91$ that decreases when calculated according to each dimension, especially in the dimension of interests as observed in Table 1. (See in annex)

In the exploratory factor analysis of the Aptitudes dimension, 7 factors were found without secondary factors taking into account the mean, while in the Interests dimension 3 factors were recommended. In general, multivariate descriptions of bias and pointing are found for the dataset with the values are analogous for both symmetries, showing tails with outliers, with the value of P being significant at a 95% confidence level

By taking into account the validity and adequacy of Pearson's correlation matrix, it was obtained that the determining value is lower (Aptitudes= 0.000001, Interests= 0.012063), being so small suggests that the variables are highly interrelated, and it could be inferred in a value close to zero that some variables are linearly dependent on others, which is confirmed by Bartlett's statistic (Aptitudes= 2519.4; Interests 1028.6), and specifically in the Interests dimension suggests that the correlation matrix is not an identity matrix, these values correspond to the Kaiser-Meyer-Olkin (KMO) test yields a value of 0.76 for aptitudes, considered acceptable, as well as its confidence range at 95% of Bootstrap for KMO (0.708-0.805), while for the Interests dimension it yields a value of 0.66 considered mediocre for the factor analysis, within a 95% confidence interval of KMO with Bootstrap is (0.61-0.72).

When performing the analysis by item according to the Sampling Adequacy Measure (MSA) that suggests eliminating those items below 0.50 (Lorenzo-Seva & Ferrando, 2021), in the Aptitudes dimension, it is suggested to eliminate 41 items, while in the Interests dimension it is suggested to eliminate 20 items.

On the other hand, the robust analysis of the goodness adjustment after the LOSSER correction (Lorenzo & Ferrando, 2023) yielded indicators for both dimensions that are summarized in Table 2, which show a good fit of the model.

On the other hand, in the Aptitudes dimension, the 7 factors taking into account the explained variance of rotated factors and reliability of the oblique EAP scores of the Phi information (Lorenzo-Seva & Ferrando, 2019; Lorenzo-Seva & Ferrando, 2016), which, although it maintains the structure

in 7 factors, proposes a reorganization of the items according to their correlations, with a high Determination Index within the factor. Regarding the ORION coefficient (which indicates the relationship of a specific factor and the total variance), with those closest to 1 contributing significantly to the total variance, we generally find values above 0.72 except for factor 6 as shown in Table 3.

While the Interests dimension, taking into account the 7 factors, according to the explained variance of rotated factors and reliability of the oblique EAP scores of the Phi information (Ferrando et al., 2022b), summarized in Table 4, high variance values are found for all factors, with 1 being the lowest. As for the ORION coefficient, only factor 5 contributes significantly, taking into account the values of the Aptitudes dimension.

When performing the suggested item elimination in both dimensions, a general Cronbach Alpha of 0.89 was obtained, and within the dimension of 0.99 on average. With which the adapted test is distributed as follows: Aptitudes Dimension consists of 27 items distributed in 7 factors, and the Interests Dimension is with 8 items distributed in three factors, with a total of 35 Items.

With this new distribution, the validation sample was analyzed, for which the data were qualified taking into account the original grouping of the test and the resulting one of the studies. In the case of the dimension of interests, it was distributed according to the initial factor analysis and a new exploratory analysis was performed for the new distribution (RMSEA=0.051), despite the fact that the correlation is affected by decreasing between factors specifically for F3 (F1 0.65 to 0.57, F2 0.67 to 0.64, F3 0.83 to 0.74) while maintaining the moderate level for all factors.

3.2. Validation of the Reduced Scale: Multifactorial Profile (PM)

When analyzing the values of Mean and Variance, they are slightly higher in the original version both in general and in Dimensions as seen in Table 5. On the other hand, it is found that both tests are equivalent taking into account the hypothetical difference of means and the P(T<=t) one tail and two tails, despite the difference in both tests measured through the t-Statistic and the critical value of t for one and two tails. Which, taking into account the degrees of freedom (415), allows us to infer an important robustness in the statistical inference presented.

On the other hand, the Alpha Cronbach of the test graded with the CHASIDE grouping (0.95) and the PM grouping (0.91), show us a high consistency of both tests. When performing a confirmatory factor analysis of the new distribution based on the validation data, an integration of the skills in a single factor considering a percentile of 95 is evidenced in the skills dimension, without any item to be eliminated, while the RMSEA with a confidence interval of 95% (0.000) shows an excellent fit, corroborated with other indicators: CFI (0.99), GFI (0.994) and AGFI (0.982) with a confidence interval of 95%.

Regarding the dimension of interests, the new confirmatory analysis shows the integration of interests in a single dimension with a percentile of 95, without any item to be eliminated, while the RMSEA is 0.051 acceptably good, with a confidence level of 95%, corroborated by other indicators: CFI (0.986), GFI (0.997) and AGFI (0.986) with a confidence interval of 95%.

4. Discussion and Conclusion

During the reduction, two approaches were evidenced in the development of tests: the use of measures of central tendency (such as the mean) and the use of relative measures (use of the

percentile) that had their beginnings in the work of Francis Galton (Michell, 2022). However, specifically in educational psychology, both approaches are related to the development of standardized tests in force to date (Ramos, 2018)

The mean approach is the one inferred in the original CHASIDE test according to the results of the factor analysis that maintains a seven-factor structure, which is consistent with Holland's work on the central trends in the relationship between people and the work environment.

However, this approach has the problem of sensitivity to outliers shared with other areas such as current data mining (Alghushairy et al., 2021), which explains the weight of tails found and the number of items without sufficient factor load. It also explains why internal consistency (Cronbach's alpha) decreases slightly in both reduction and validation. On the other hand, the percentile approach from the results of the factor analysis in the reduction offers greater robustness against outliers, eliminating those that provide less burden.

Therefore, it is possible that psychometric tests lose consistency with the construction method and structure. In this case, it is possible that Holland used the content method (Medrano et al., 2019) to establish the domains from his personality theory, and by using factor analysis within the reduction process, an unrelated structure emerged, as in our case, eliminating the unifactorial approach of RIASEC, which could be explained by processes similar to those of other preference tests, such as the learning styles test proposed by Alonso et al. (Castellanos et al., 2023) where there is no single predominance.

It is likely that intrinsically reduction by factor analysis entails ethical and emic item biases (Medrano et al., 2019), which reflect changes in universal and particular aspects within populations, which we recommend to be addressed in future research.

In the context of the test, if we take into account the proportion of items eliminated in skills (58.57%) and interests (71.43%) and the number of items (from 98 to 35), we infer according to the number of items retained that the dimension of Skills is more stable. This is understandable if we take into account that they are based on aspects related to capacities and skills common to all human beings, unlike Interests that vary between individuals and groups.

Consequently, we could infer that skills-based instruments provide a more solid scenario for vocational decisions over time and cultures, although the focus of interests could be more adjusted in an environment that requires professional reorientation, in case skills are limited in the individual context by circumstances such as health affectations, automation of functions, labor reconversion, among others.

As for Interests, we find more pronounced differences between the original formulation and the emerging dimensions, as evidenced by the elimination of the Conventional type (interests related to structured and organized environments, where established rules and procedures can be followed).

This can be explained by a change in the social structures that promote self-employment and entrepreneurship processes, taking into account that in Colombia self-employment represents 51.2% of total employment (INNPULSA, 2021), correlated with a societal change in the way of conceiving labor relations, with the individual being their employer and employee at the same time (Han, 2021b), as well in situations that can be explained under the uncertainty and risk approaches (Flechoso, 2020).

On the other hand, the results of occupational associations with respect to personality types can infer work processes in disciplinary teams such as: interdisciplinarity (Díaz et al., 2020), as well as a change in employment areas (Díaz et al., 2020) (International Labour Organization, 2023), and the emergence of new labor areas (Torres, 2024) visible from the factorial distribution of occupational interests.

If we take into account the trends of adaptation, reduction and validation, we could conclude that there is a generalized need to have instruments with greater simplicity and precision, giving perhaps excessive weight to the quantitative component, which could distort the sense of the human of vocational orientation in the convergence with social trends such as dataism (Leandro, 2019) (Han, 2021); and exacerbated by automation supported by Artificial Intelligence under proposals such as: Singularity Experts, CareerExplorer, Pymetrics or mySkillsFuture.

In this regard, although technology has made a significant contribution to data processing, it allows, among other things: a) to generate meeting and support scenarios that save the space-time synchrony of face-to-face teaching, b) to reduce direct and indirect costs of vocational guidance processes, c) to provide a more sustainable alternative by reducing the use of single-use paper in school environments (Canul et al., 2022).

It also generates challenges, including those related to its significant emission of CO2 into the environment (Álvarez & Enríquez, 2020), growing consumption of fresh water (Li et al., 2023), cybersecurity (Acelera Pyme, 2023), cyberaddiction, cognitive gap, and social gap, among others. In order to avoid situations that endanger people and data, with the foreseeable circumstances possible in a hyperconnectivity operated in contexts with low quality of connectivity and high obsolescence in software and hardware such as that of the target population.

In conclusion, technology provides opportunities in the field of research and development in vocational guidance while generating new challenges. In our case, it has allowed us to generate a reduction and validation that responds to the needs through a simple and reduced structure, in confluence with an organization of face-to-face activities, and has limited us in terms of sample size and the possibilities of self-application of the instrument due to the technological capabilities implemented in the region.

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Annexures

Table 1. Overview of the Reduction Sample

	Alfa Cronbach	Variance	Average Standard deviation
General	0.91	0.23	0.48
Skills	0.89	0.23	0.48
Interests	0.80	0.21	0.47

Source: Own elaboration

Table 2. Model fit indicators

Indicator	Skills	Interests
Minimum Chi-square Adjustment Function	0,99	0,99
NNFI (Non-Normed Fit Index)	0,96	0,96
CIF (Comparative Fit Index)	0,97	0,98
GFI (Goodness of Fit Index)	0,95	0,98
AGFI (Adjusted Goodness of Fit Index)	0,93	0,92
Root Mean Square Error of Approximation (RMSEA)	0,028 (P=1)	0,21 (P=1)

Source: Authors' elaboration based on data from the report generated in Factor Analysis

Table 3. Relationship of factors with total variance

Factor	Variance	ORION	Factor Determination Index
1	3.070	0.811	0.901
2	2.747	0.811	0.900
3	1.893	0.722	0.850
4	5.548	0.899	0.948
5	2.136	0.774	0.880
6	1.322	0.676	0.822
7	4.253	0.868	0.932

Source: Authors' elaboration based on data from the report generated in Factor Analysis

Table 4. Relationship of factors with total variance: Interests

Factor	Variance	ORION	Factor Determination Index
1	0.909	0.630	0.794
2	1.112	0.656	0.810
3	1.364	0.663	0.814
4	1.171	0.657	0.811
5	1.598	0.774	0.880
6	1.079	0.627	0.792
7	1.097	0.672	0.820

Source: Own elaboration

Table 5. Validation Statistics Reduced Scale: Multifactorial Profile (PM)

	Skills		**Interests**	
	CHASIDE	***PM***	***CHASIDE***	***PM***
Media	42,32	17,03	16,93	5,81
Variance	246,59	51,46	37,62	5,76
Pearson's correlation coefficient	0,96		0,87	
Hypothetical difference of the means	0,00		0,00	
Degrees of freedom	415,00		415,00	
Statistic t	57,11		53,95	
P(T<=t) one tail	0,00		0,00	
Critical value of t (one tail)	1,65		1,65	
P(T<=t) two tails	0,00		0,00	
Critical value of t (of glues)	1,97		1,97	

Source: Own elaboration