REVISTA CÁTEDRA

Vocational and professional guidance as an alternative in the choice of university careers

Orientación vocacional y profesional como alternativa en la elección de carreras universitarias

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Abstract

Vocational and professional orientation processes should allow high school students to select a university career oriented to their life project. However, many students drop out in the first semesters of college due to various factors (economic, emotional, psycho-pedagogical, among others). Among these is also the lack of professional orientation and the

construction of vocational and professional tasks that consolidate this career choice. The objective of this research work was to determine the influence of the professional orientation process on the choice of university careers in third year high school students. The approach used was quantitative of an explanatory and correlational type supported by a qualitative analysis process of an interpretative hermeneutic type. The study population was selected through a purposive sampling and consisted of 342 students in the third year of high school from various public and private educational institutions in Ecuador. A battery of tests of professional aptitudes and interests and a structured interview were used as research instruments. The results of the statistical study carried out have made it possible to identify the influence of professional orientation on the choice of a university career in the study population. It is therefore concluded that this process could help students in this context to choose a career aligned with their life project and aptitudinal potential.

Keywords
Student, evaluation, career guidance, social participation

Resumen
Los procesos de orientación vocacional y profesional deberían permitir al estudiante de bachillerato seleccionar una carrera universitaria orientada a su proyecto de vida. Sin embargo, son muchos los estudiantes que desertan en los primeros semestres de la universidad debido a diversos factores (económicos, emocionales, psicopedagógicos, entre otros). Entre estos se encuentra también la falta de orientación profesional y la construcción de tareas vocacionales y profesionales que consoliden esa elección de carrera. El objetivo del presente trabajo de investigación consistió en determinar la influencia del proceso de orientación profesional en la elección de carreras universitarias en estudiantes de tercero de bachillerato. El enfoque utilizado fue cuantitativo de tipo explicativo y correlacional apoyado en un proceso de análisis cualitativo de tipo hermenéutico interpretativo. La población de estudio fue seleccionada a través de un muestreo intencional y estuvo conformada por 342 estudiantes de tercero de bachillerato de diversas instituciones educativas públicas y particulares de Ecuador. Como instrumentos de investigación se utilizó una batería de prueba de aptitudes e intereses profesionales y una entrevista de base estructurada. Los resultados del estudio estadístico realizado han permitido identificar la influencia de la orientación profesional en la elección de una carrera universitaria en la población de estudio. Se concluye por consiguiente que, este proceso podría ayudar a los estudiantes de este contexto a elegir una carrera profesional alineada a su proyecto de vida y potencial aptitudinal.

Palabras clave
Estudiante, evaluación, orientación profesional, participación social.

1. Introduction
In Ecuador, and mainly at the high school level, there are many students who have difficulties when selecting a university career. Reading Viteri, one could reflect on whether this difficulty occurs as a result of a non-consensual and momentary personal reflection that could influence in the future and in a determining way in some cases in the personal, academic and professional life of the student who makes this decision (Viteri, 2018, p. 365). Faced with this, Rodríguez (2020) analyzes how the educational community at the baccalaureate level tries to solve this difficulty by providing students with a "greater

amount of information so that they can select a professional career oriented to their life project, their tastes and interests" (p. 49).

Considering the above, there are many professionals in the psychological and mainly psycho-pedagogical fields who offer their professional services with the purpose of contributing in a technical way to make this choice of professional career the right one. According to the criteria of Briones and Triviño (2018) "it can crystallize in a better way taking into account some aspects that empirically the student is unaware of" (p. 6) such as, for example, their academic potentialities, their personality characteristics, their learning style, their aptitudes, and professional interests.

Vocational orientation according to the perspective of the authors Verdesoto et al. (2018) is constituted as "a psycho-pedagogical process of counseling prior to the choice of a baccalaureate specialty where a comprehensive assessment of the student's skills, abilities and capacities is performed" (p. 14). This is in order to guide their vocation and identify the so-called vocational and professional tasks that are necessary to ensure academic success in that area. Due to the fact that currently very few professionals carry out this process and also because the current educational and curricular reform eliminated high school specialties such as: physical-mathematical, chemical-biological and social sciences; the development of specific skills and knowledge oriented to certain professional careers had to be rethought to compensate for this reality. This has somehow led students to select a science or technical baccalaureate that does not prepare them to integrate knowledge and improve their university entrance profile.

Precisely, according to the authors Ocampo et al. (2017) the construction of these vocational and professional tasks within the classroom "allow the student to determine much more effectively what their academic development profile is" (p. 341), in order to match their profile of competencies and aptitudes with the choice of baccalaureate to be selected. Once this choice is consolidated, choosing a professional career should only be a matter of time. However, students who make these decisions focus on socioemotional and economic aspects and not on those important determinants such as academic quality, the development of their potential and their vocation.

According to Mejía (2019), the concept of vocation refers to the "inclination of a person to dedicate his or her time and effort to a certain activity that generates a lot of satisfaction" (p. 383). Faced with this, the construction of the tasks associated with vocation should consolidate the tastes and interests that a person defines in a period of time to guide him/her professionally. However, the student's profile and the construction of these tasks that according to Ocampo et al. (2017) are the ones that "determine to a large extent what will happen with the so-called professional choice" (p. 341).

The authors Santana and Vigueras (2019) define career guidance as "also a psycho-pedagogical process that allows consolidating the choice of a professional career according to the vocational development profile and the construction of specific tasks" (p. 12), which according to Figueroa et al. (2021) "should be evaluated with a battery of psychometric tests and through qualitative-quantitative methods to provide validity to the definitive diagnosis of orientation" (p. 853) this, accompanied by the suggestion of university careers offered by the professional in charge of this process. However, according to Erazo and Rosero (2021) there are many psychology professionals who consider that "the partial evaluation of certain aspects can offer them in a very clear way a diagnosis that integrates all the components mentioned above" (p. 593).

A professional orientation process therefore according to Mejía et al. (2018) must "include a previous diagnosis of the motivations that led the student to select in the first instance, a baccalaureate specialty over the others" (p. 385), this because the academic components that form the university entrance profiles must match the student's vocational development profile to guarantee in something a possible academic success and, it is precisely at this moment where, due to lack of orientation or knowledge, students choose a university career without knowing any of these aspects.

According to the above, the general objective of this research work was to propose a correlational study to determine the influence of the vocational orientation process in the choice of university careers in third year high school students of public and private educational institutions in Ecuador; for this, the design of the article has the following structure: a brief introduction to the topic and problem of study, the methodological foundation that supports the research process and the application of instruments, a space where the main results obtained are analyzed and discussed, and a section where some conclusions of the work are made.

2. Method

The study population was selected through a non-probabilistic sample by convenience and consisted of 342 students (171 males and 171 females) in the third year of high school from public (122 students), private (95 students) and municipal (125 students) educational institutions in various Ecuadorian provinces. The research process counted with the informed consent of the entire study population for the data collection, information analysis and final interview where, once this phase was completed, the suggestion of professional careers adapted to the student's profile and life project would be made.

The techniques used in the research process were:

Standardized test with its standardized test instrument. In this research process, a battery of five standardized and structured-based tests of differential aptitudes (abstract, verbal, numerical, mechanical, and spatial reasoning) known commercially as DAT in its "A" form was used.

This form of the reagent was adapted to the Ecuadorian context by psycho-pedagogues from the Department of Professional Orientation of the Central University of Ecuador, who carried out the processes of criterion, content and construct validity in high school and university students, generating a scale that considers scores on a percentile scale (0-99 points) for its qualification.

Due to its versatility and the context of the covid-19 pandemic, authorization was requested to this agency to carry out the virtual adaptation of this battery of reagents without this implying that they lose their criteria of validity and reliability in the diagnosis of the results.

- We proceeded in a similar way with the adaptation of the tests of professional interests (GEIST - test that measures 12 areas of interests and offers a diagnosis of dominant, average and non-significant benefits) and spatial intelligence (Raven General Scale. - test that offers a diagnosis of spatial intelligence and analysis by comparison).
- Interview with its instrument, the interview script (which met the criteria of validity of experts prior to its application) and served as a starting point to establish qualitatively through an interpretative hermeneutic analysis the consolidation of vocational and professional tasks in the students of the investigated context, which

are essential in the choice of a professional career adapted to their potential and life project.

In order to analyze the results obtained and subsequently offer a diagnosis of the career guidance process, a quantitative, descriptive, explanatory and correlational research approach was used, where all the tests applied were scored and the results obtained were transformed into percentile scores. With this it was possible to obtain the result of professional interests, aptitudes, and spatial intelligence, which is an integral part of the quantitative analysis of the orientation process. Subsequently, these results were grouped, and the professional profiles of each applicant were compared with the entrance profile to various university careers; this allowed us to suggest a career that was more adapted to the characteristics of the student evaluated, which could also be adjusted to his or her life project.

To complement this diagnosis, the results of the career guidance interview were compared with those obtained in the application of the tests applied following the research criteria of the authors Hernández-Sampieri et al. (2018) confirming in this way and for the second time that, the suggested diagnosis was adapted to the life project referred to in the final interview with the student. In order to delimit the scope of the results and establish significant differences within the study population, two working hypotheses were raised: the first one was if there is a significant difference between the development of professional interests, intelligence aptitudes that affect the professional decision of the investigated students; and the second hypothesis that had to do with the differentiated choice of a professional career defined the type of school, type of university (support) type of career (by broad and specific field of knowledge) and gender where statistically significant results were obtained; for this, four individual Pearson's chi-square tests were performed considering the study variables and hypotheses raised using the statistical software SPSS version 25 relating the variables mentioned above.

3. Results

The results obtained in the application of the psychometric test battery are divided into three parts: Aptitudes: in this area, five aptitude tests (DAT, form "A") were applied:

a) a) Abstract reasoning is the capacity to think and process information through the operations of analysis and synthesis. It allows the subject to induce, deduce, conclude, and formulate hypotheses. Ability to work or reason with symbols. That is, with non-verbal situations representative of subjective thinking.
b) b) Spatial reasoning is the ability to reason and handle objective structural concepts: shapes, sizes, distances, perspectives, among others. It establishes reasoning with volume, weight, texture, among others. It is the spatial relationship representative of objective or practical thinking. This type of reasoning requires mental manipulation of objects in three dimensions.
c) c) Verbal reasoning is the ability to understand and process concepts expressed through verbal symbols (words) and the essence of verbal and written messages in order to respond to those messages. Quality of abstracting, generalizing and constructive thinking (thought expression). It does not lie in simple verbal fluency or knowledge of vocabulary.
d) d) Numerical reasoning is the ability to understand numerical relationships and reason with quantitative material. Practice of knowledge and mastery of strictly mental computation. Minimizes the use of language to avoid interference from verbal factors. Most of these reasoning tests measure only computational skills.

They require the understanding of numerical relationships as a function of concepts; and,

e) e) Mechanical reasoning is the ability to understand and apply physical and mechanical principles. Handling of physical-mechanical problems that arise in ordinary life situations. It uses simple mechanisms, familiar to most of the subjects, which do not require specific scientific knowledge.

In the aptitude tests, the average percentile results obtained by type of school have identified a greater degree of development in numerical (61/99), abstract (49/99) and verbal (41/99) aptitudes, which would necessarily imply that these students have a greater development in the handling of basic mathematical operations, logical reasoning and an adequate knowledge of language, while the aptitudes that have been identified as less developed are those of the mechanical type (33/99) interrelated to the resolution of problems related to physics and chemistry, and spatial reasoning (15/99), which has to do with the management of structural and objective concepts (See Table 1).

Type of school	Abstract	Verbal	Spacial	Mechanic	Numerical
Fiscal	51	41	8	36	56
County	46	42	23	30	65
Private	50	41	15	33	64
Overall average	49	41	15	33	61

Table 1. Average percentile scores for aptitude by type of school

Professional interests. In this area, a test was applied that measures ten areas in male students and eleven areas in female students (GEIST differential aptitude test - male and female scale):

a) a) Professional interest of persuasive type are activities related to the communication of ideas, which involve action of convincing or influencing one person to another. Examples: law, social work, psychology, international business, foreign trade, marketing, social communication, sociology, and political science, among others.

b) b) Professional interest of administrative type are activities that involve systematization and organization in office work or management processes. Example: public administration engineering, business administration engineering, auditing, and accounting engineering, economics, statistical engineering, financial engineering, social communication, dental assistant, among others.

c) c) Professional interest of mechanical type are activities related to the handling of machines, tools, and instruments by means of micro and macro manual skills. Example: engineering, architecture, medical technology, dental technician, dental assistant, automotive mechanics, industrial mechanics, electromechanics, among others.

d) d) Professional interest of musical type are activities that refer to the appreciation, discrimination, composition, direction, execution of sounds, melodies, rhythms, and musical harmonies. Example: composition, voice-over, orchestra conducting, interpretation, sound engineering, multimedia design, radio, and television production, among others.

e) e) Professional interest of scientific type are activities aimed at the knowledge of the function, organization, structure, and use of the constituent elements of living

beings: human beings, animals and plants. Example: medicine, nursing, obstetrics, medical technologies, genetic engineering, agronomy, veterinary science, chemical sciences, dentistry, among others.

f) f) Professional interest in outdoor activities are activities related to the preservation, maintenance and sustainable production of nature and the environment, including physical and motor activity in open spaces. Example: military careers, physical education, agricultural engineering, geology, mining, oil, environmental, tourism, marine biology, among others.

g) g) Professional interest of literary type are activities concerning the analysis, discrimination, production, creation, and reproduction of thoughts, through written, oral or mimic language. Example: teaching, political science, sociology, public relations, social communication, psychology, social work, economics, among others.

h) h) Professional interest of numerical type are activities concerning the handling of dimensions, weights, volumes, lengths, proportions, and measures in general. That is to say, all the elements that represent quantitative, real and abstract relations. Example: engineering, topography, geomensura, economics, financial engineering, statistical engineering, accounting, and auditing engineering, commercial engineering, architecture, among others.

i) i) Artistic professional interest are activities related to the organization, appreciation, expression, recreation and execution of elements and instruments that involve the use of creative and aesthetic thinking. Example: architecture, arts: painting, sculpture, ceramics, and engraving. industrial design engineering, computer graphics, graphic design, bachelor's degree in design and drawing, sound engineering, multimedia engineering.

j) j) Professional interest in social service activities are activities aimed at the promotion and development of social and personal welfare of the community, through the implementation of policies aimed at achieving a harmonious coexistence, directed towards social transformation. Examples: law, psychology, medical sciences, dentistry, teaching, social work, sociology, public relations, political science, among others.

k) k) Professional interest of dramatic type are activities aimed at learning, execution, exhibition, and representation of roles, before a present or imaginary audience (theater hall, cameras, audio equipment, media, among others) Example: acting, script writing, interpreters, theater production, film, radio, television, marketing, flight attendants, stage management, among others.

l) l) Professional interest in personal service activities are activities that encompass the achievement of personal satisfaction for the proper use of leisure time, health, nutrition, beauty, and aesthetics. Example: flight assistance, medical emergencies, nursing assistant, cosmetology, gastronomy, hotel management, security guard, military branches, dental assistant, tourism, among others.

In relation to the results obtained in the tests of professional interests, it can be identified by type of school (See Table 2), that the highest degree of professional interests are centered in the following areas: 1) Musical, 2) Outdoor activities, 3) Dramatic, 4) Mechanical, 5) Artistic, and 6) Social Service. Considering what is observed in Table 2, it can be deduced that professional interests guide the choice of careers towards professions associated with the field of human sciences and health.

Type of school

Professional Interest	Fiscal	County	Private	General average
Administrative	48	46	46	47
Mechanical	52	52	51	52
Musical	65	53	59	59
Scientific	38	54	45	45
Outdoor Activities	59	51	57	56
Literary	43	48	45	46
Numerical	40	43	41	42
Artistic	50	51	50	50
Social Service	43	52	49	48
Dramatic	52	54	54	53
Personal Service	52	54	26	44

Table 2. Average professional interest scores by type of school

In relation to the analysis of professional interests from a gender perspective (See Table 3), it can be identified that the highest degree of professional interests is centered in the following areas: 1) Scientific, 2) Dramatic, 3) Personal service, 4) Musical, 5) Social service, and 6) Outdoor activities. Considering also what is observed in Table 3, it can be deduced that professional interests guide the choice of careers towards professions associated with the human and health sciences and in very few cases to professions associated with the basic and technological sciences.

Gender	Male	Female
Administrative	47	46
Mechanical	53	51
Musical	65	53
Scientific	37	54
Outdoor Activities	60	52
Literary	44	48
Numerical	40	43
Artistic	50	51
Social Service	44	52
Dramatic	52	54
Personal Service	----	54

Table 3. Average career interest scores by gender.

Interview script: this instrument allowed the qualitative identification, through an interpretative hermeneutic and ethnographic analysis of action participation, of the students' individual criteria in terms of the construction of vocational and professional tasks, the perspective of the profile for entering a university career and the referential development of their professional aptitudes which, combined with their professional interests, were adapted to the choice of a possible career and a transcendent life project. For this, the professional in charge of the professional orientation process followed the following steps:

a) a) The results obtained in the aptitude tests were analyzed quantitatively and individually, verifying their final percentile score,

b) b) The results obtained in the professional interest's test were analyzed quantitatively and individually, where, according to the scores, the areas were divided into three subsets or triads (dominant areas with scores over 70, medium areas with scores between 30 and 69, and non-significant areas with scores below 30).
c) c) After this, the student's reference criteria obtained through the interview script were qualitatively analyzed and the quantitative analysis of the results obtained in the application of the tests was integrated, with the purpose of determining which professional careers would be more in line with their aptitudinal and interest development profile, which should match their perspective of construction of vocational and professional tasks and their life project.

To verify this premise, four individual Pearson's chi-square tests were performed on the following variables: type of school, type of university (support), type of career (by broad and specific field of knowledge and gender.):

Correlated variables	Pearson's Chi-Square	Df	Asymptotic Significance (bilateral)
Suggested career - type of school	45,915	3	0.001
Suggested career - type of university (public or private)	15,919	3	0,000
Suggested career - gender (male and female)	277,120	78	0,001
Suggested career - by broad and specific field of knowledge	327,442	156	0,000

Table 4. Chi-square tests

4. Discussion

In Ecuador, at the moment, it has not been effectively measured whether the curricular reform that left aside certain baccalaureate specialties has allowed students at this level of education to consolidate an adequate entry profile that would allow them to access higher education much better prepared. According to Figueroa et al. (2021) this change in the educational paradigm is considered "a mistake because there was no adequate articulation with higher education institutions" (p. 868) since the careers and programs offered did not modify their entrance requirements adapting them to the graduate profile differentiated by type of baccalaureate specialty. Reading Quishpe (2022), this would make a lot of sense since those students who have "better cognitive conditions would have an academic and aptitudinal advantage over the rest" to enter in better conditions to study a university career (p. 1172).

Due to the above, at the moment there are many students who select a university career with a general baccalaureate profile that does not differentiate their potentialities and that, in addition, does not allow them to adequately consolidate the construction of their vocational and professional tasks, this because the baccalaureate specialty that they have to study forces them to consolidate an academic profile that is not necessarily adapted to the development of their aptitudes, interests and knowledge.

In order to consciously access the choice of a university career, be it technical or professionalizing, the authors Andrade, et al. 2017 and Cancino 2018 suggest that the

student has access to a wealth of academic information on the career he/she intends to select, such as the entrance profiles and requirements and that, additionally, he/she knows and identifies the development of his/her knowledge, aptitudes and professional interests. This could allow him/her, complementarily with the realization of a professional orientation process, to analyze more in detail all these variables (Andrade, et al. 2017, p. 33, Cancino, 2018, p. 115).

Unfortunately, according to the observations made by Yépez et al. (2019) "career guidance processes are carried out empirically by many professionals in psychology and other branches" (p. 50) where a single test of professional interests is often used. This therefore implies that students make a decision that could affect the rest of their academic and professional life based on a single argument.

If we add to this premise the gender biases and power relations established as part of social learning in an academic environment, the biased choice of a university career would make much more sense. It is very common today to still hear comments from students who are close to choosing a university career such as: "do not study early education because it is a career for women"; or: "do not follow engineering because it is a career for men who know mathematics" where, according to the criteria of the authors De la Hernán et al. (2018) "the aptitudinal and cognitive potential of the student and their professional interests have no place and do not match with the consolidation of their life project due to the implication of these gender biases" (p. 158).

5. Conclusions

One of the main conclusions of the research process has made it possible to determine the influence of the professional orientation process in the choice of university careers in third year high school students from various public and private institutions in Ecuador. Additionally, the descriptive results and the correlational study carried out have made it possible to analyze that this choice is influenced by the type of school the students attend, the type of professional career they choose, their gender and the broad-specific field in which this career choice is ultimately consolidated.

Considering the aforementioned and according to the criteria of the authors García et al. (2020) "educational guidance processes must respond to multifactorial and pedagogical criteria" (p. 47) hence the present research process has put forward a new methodological proposal to carry out a process of professional advice and counseling that allows students in the third year of high school to make a conscious decision when selecting a university career matching their life project without gender stereotypes.

The authors Lucero et al. (2020) mention that "the vocational characteristics and social behavior of students today has changed significantly" (p. 28) due to sociocultural factors that affect decision-making regarding professional choice and how this is affected by external variables, leaving aside the individual's own capabilities or potentialities that do play a transcendental role in the choice of a university career.

Finally, according to Ramirez et al. (2019), "education in Ecuador still presents major problems and strong gender stereotypes" (p. 34) that affect in a transcendental way how teachers teach and direct students to consciously choose a particular university career and how students, with the tools available at the time, make a decision that could affect their academic, personal and professional future.

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