

Identification of student profile, learning preferences and postgraduate studies preferences in animation students

Identificación del perfil, preferencias de aprendizaje y de estudios de posgrado en alumnos de animación

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Abstract

The professional careers related to graphics and art, including film animation, have a profile of the academic participant very particular, different from other university careers, young people who learn mainly through doing, instead of cognitive reflection in itself, so teaching is usually taught with a rather vigotsky approach, in a context where knowledge is situated, product of activity, context and culture. Where the teacher usually works using a set of strategies for meaningful learning based on situated and truly experiential teaching: authentic problem solving, learning in action and service, case analysis, project implementation, site simulations, etc., all in terms of their potential to promote the desired competences in the subject (Rodríguez Alanís, Garza Moya, Tovar Rosas, Arreola Burciaga, & Pérez Barraza, 2022). In this context, it is necessary to have scientific evidence that allows elucidating the profile of entry and exit of the student of an animation career, as well as their learning preferences, with a view to the possible curriculum design of an ex professor postgraduate course for graduates of that professional career, the present research being carried out through a qualitative-quantitative study.

Resumen

Las carreras relacionadas con la gráfica y el arte, entre las cuales se encuentra la animación cinematográfica, cuentan con un perfil del participante académico muy particular, diferente al de otras carreras universitarias, jóvenes que aprenden principalmente a través del hacer, en vez de la reflexión cognitiva en sí misma, por lo que la enseñanza suele impartirse con enfoque más bien vigotskiano, en un contexto donde el conocimiento es situado, producto de la actividad, el contexto y la cultura. Donde el docente trabaja empleando estrategias para el aprendizaje significativo basadas en la enseñanza situada y verdaderamente experiencial: la solución de problemas auténticos, aprendizaje en el actuar y el servicio, análisis de casos, realización de proyectos, simulaciones situadas, etc., todo ello en términos de su potencial para promover las competencias deseadas en la asignatura (Rodríguez Alanís, Garza Moya, Tovar Rosas, Arreola Burciaga, & Pérez Barraza, 2022), haciéndose necesario contar con evidencia científica que permita dilucidar el perfil de ingreso y egreso del estudiante de una carrera de Animación, así como sus preferencias de aprendizaje, con miras al posible diseño curricular de un posgrado ex professo para los egresados de dicha carrera profesional, llevándose a cabo la presente investigación por medio de un estudio de corte cualitativo-cuantitativo.

**Educational diagnosis, Curriculum design
Postgraduate studies, Animation students**

**Diagnóstico educativo, Diseño curricular posgrado,
Estudiantes de animación**

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Introduction

The so-called "Creative Industries" have advanced significantly in Mexico since 2008, as evidenced by the number of reports, economic data, development expectations, etc. generated since then by both civil society organizations and the Ministry of Economy itself, where Mexico already appeared as one of the top 20 exporters in the global market for creative products, even reaching sixth place among developing countries, and the only Latin American country among the top 20 worldwide (Mission of Mexico to the EU, Representation Office of the Ministry of Economy, 2009).

It is in this context that the Engineering in Animation and Visual Effects (IAEV) was born in 2011 as the first career focused on animation in a Mexican public university: The Polytechnic University of Gomez Palacio, considerably boosting not only the audiovisual industry of the state, but has brought talent to the animation industry, as evidenced by the successful incursion of graduates in national and foreign studios, such as the case of Lety Maycotte -2nd IAEV generation- who has participated in major animated productions such as "Hotel Transylvania 3", "Detective Pikachu", "Frozen 2", as well as in the winner of the Golden Globe, BAFTA and Oscar for best animated film in 2019 "Spiderman: A New Universe" (Rodríguez, 2019).

Thus, it seems a good time to promote the creation of a postgraduate program to help strengthen this career and industry, since the implementation of postgraduate programs is important as a potential trigger for the economies of developing countries, as suggested by the IDB in its report "Science, technology and innovation in Latin America and the Caribbean: A statistical compendium of indicators" (Crespi, Navarro, & Zuñiga, 2010), in addition to the fact that currently the few that exist in that country are found only in private universities, being an area of opportunity for professional public education in Mexico. For this it is important to know aspects such as the profile of entry and exit of students in the last year of IAEV, their learning preferences, as well as the motivations that these students might have to study a graduate degree and of course needs and issues that should have an effective graduate and continuing education program related to animation.

The curriculum planning process is one of the determining moments in the development of new educational options. (Chaparro Sánchez, Escudero Nahón, & Morales Barrera, 2017). and the aforementioned information would allow for a more methodological and therefore precise curriculum design, since the conceptual development of the theory-practice link as a field of study and application has a broad impact on the definition of the curriculum. (Casarini-Ratto, 1997).

Discerning curriculum design as the systemic approach to educational problems, it should be taken into consideration that it implies initial assumptions, planning and conceptualization phases. In this sense, Dr. Frida Díaz-Barriga recommends four phases in curriculum design:

- Career rationale.
- Elaboration of the professional profile.
- Curricular organization and structuring.
- Continuous evaluation of the curriculum.

(Díaz-Barriga Arceo, Lule Gonzalez, Pacheco Pinzón, Saad Dayán, & Rojas-Drummond, 2012).

In this regard, Gómez and Herrera warn about the importance of study programs in student motivation, warning against the little attention that is usually paid to the postgraduate level in this area, where the possibility of desertion is greater when the needs of undergraduate students (as well as those of university students) regarding the achievement of their expectations are usually considered as irrelevant, so they urge (citing Chabolla, 2001 and Vera, 2009 respectively) to take care of the design of such programs following scientific and methodological bases to validate the needs and interests of students reflected in such programs. This is particularly true in arts-based postgraduate programs, since beyond the traditional questionnaires where they seek to know predilections and interests, likes and dislikes, little importance is usually given to artistic activities as such, sometimes resulting in dissociated programs.

An important point about this is what has to do with art pedagogy, since, as Gómez and Herrera (citing Acha) point out once again, teachers in art-related careers are usually relatively updated in terms of traditional pedagogical practice, but little willing to innovate in the didactics of art teaching and its techniques, hence the importance of knowing the student's learning preferences.

The problem of theory and practice is one of the most important in curriculum design, so that evaluation and research "from within", as Casarini points out, can be considered as a solution to this problem. Currently, research in the area of the arts, within university education, is one of the topics most widely explored by renowned researchers, given the importance of this field (art) for economies, societies and education itself. (Barriga Monroy, 2011). Thus, UNESCO speaks of contextualizing theory through the practice of artistic disciplines, from a multidisciplinary approach, where research in arts education must then study the artistic discipline, at the same time as the educational field. (UNESCO, 2006).

As far as the motivation to study a postgraduate course is concerned, the inclination for an activity is awakened by a need - of physiological or psychological origin - that breaks the state of equilibrium existing up to that moment, creating a state of tension/dissatisfaction that then drives to action, so that the tension is then discharged and once the need is satisfied, the organism returns to its original state of equilibrium. (Carrillo, Padilla, Rosero, & Villagómez, 2009). One of the objectives behind the present research will be to determine the existing motivations in an undergraduate student to be interested in studying a postgraduate degree.

Finally, knowing through firm statistical data the profile of the final year animation student, both in terms of entering the career and graduating, beyond simply writing such profiles, allows through statistical data to check to what extent the student complies with them, and therefore contextualize the curricular design of a possible graduate program, since statistical techniques enable the description of groups of data, as well as inference focused on broader sets.

General objective

To evaluate the formative needs for graduate studies in Animation and Visual Effects Engineering at the Polytechnic University of Gomez Palacio, Durango, Mexico.

Specific objectives

- I. To identify the entry and exit profiles of students in the last year of the Animation and Visual Effects Engineering program.
- II. To identify learning preferences in IAEV senior students.
- III. To point out the motivations existing in an undergraduate student to be interested in studying for a postgraduate degree.
- IV. Explore the possible lines of training and contents of future postgraduate programs at IAEV.
- V. Determine interests in graduate studies or specialization in IAEV's final year students.

Methodology to be developed

Statistical techniques make possible the description of groups of data, as well as inference focused on broader sets. The methods developed by Statistics constitute an important instrument for scientific study, so they can be applied in different fields of knowledge, including the social sciences, one of them being educational research, where statistical techniques are particularly useful in positivist research and, specifically, in the data analysis phase, where it is possible to infer relationships between phenomena, populations and specific contexts (Gil-Flores, 2003). Such is the case of the present research, where we proceeded to the study of a social phenomenon, in this case trying to elucidate the profile of entry and exit of the student of the Animation and Visual Effects Engineering, as well as their learning preferences, with a view to the possible curricular design of a graduate degree ex professo for the graduates of this professional career.

Therefore, questions related to the possible motivations and inherent professional approach were also asked, through the use of a survey instrument, which gave numerical data collected about a reality or a context, obtaining products from its processing through the application of a systematic work method. The procedures to arrive at these results, consisting of the collection, arrangement and presentation constitute the statistics (thus in singular) that supports the present educational research, whose results.

Population and sample

Arias-Gómez (Arias Gómez, Villasís Keever, & Miranda Novales, 2016) defines the study population as a set of cases, well defined, limited and accessible, which will form the reference for the selection of the sample that meets a series of predetermined criteria. Thus, for this purpose, the study population was taken into account as the 9th and 10th semester students of Animation and Visual Effects Engineering (IAEV) belonging to different IES attached to the subsystem of Technological and Polytechnic Universities. This segment was chosen due to the central theme of this research which revolves around the postgraduate interests of IAEV students, for which it is considered that only students in the last segment of their career can have the professional skills and therefore the intimate knowledge around the professional nature of it, as well as the potential motivation for the study of a postgraduate degree. Likewise, this segment allows measuring other aspects of interest for this study, such as a comparison between the entry and graduation profiles, as well as their learning preferences, among other axes explored. The final population was 110 respondents, of which 39 correspond to the Polytechnic University of Gómez Palacio (UPGOP), 48 to the Polytechnic University of Sinaloa (UPSIN), 15 to the Polytechnic University of Santa Rosa de Jauregui (UPSRJ) and 8 to the Polytechnic University of Bacalar (UPB).

Research instrument and its application

In order to carry out the research, we worked with an instrument composed of 7 research axes, 18 complex variables and 111 simple variables, of which 4 are nominal and 106 are interval variables, using a scale from 0 to 10, the distribution being as follows:

Axes	Complex variables	Simple variables
Information	1 ítem	4 ítems
Person axis	2 ítems	9 ítems
Entry Profile	3 ítems	24 ítems
Profile of graduates	3 ítems	20 ítems
Postgraduate motivation	2 ítems	15 ítems
IES Axis	5 ítems	19 ítems
Postgraduate curriculum design	2 ítems	20 ítems

Table 1 Axes and variables of the research instrument
Source: Own elaboration

The nominal variables were chosen to organize the information according to gender, age, UP where he/she is studying, and to know if at this moment, in the final cycle of his/her career, he/she is formally working in his/her professional field.

The wording of each of the statements was done in the most understandable way for the respondent. At the same time, the instructions were precise and easy to follow, considering that the appropriate features of a form should be: clear and concrete questions, set out in a rigid and pre-established order that cannot be modified, giving rise to brief and concise answers. (García Cordova, 2002). The application of the instrument was done through Microsoft Forms, sharing the link to the IAEV directors of the different participating HEIs who kindly agreed to apply it, remaining active from June 6 to July 30, 2022. Subsequently, the database was downloaded in Excel and imported into the STATISTICA 10 program, obtaining 110 responses (with zero cases of missing data), which is considered a significant representation of the chosen population, obtaining a Cronbach's alpha of .953, which is an excellent percentage of reliability in the instrument. (Frías-Navarro, 2022). The mean of the responses was 790.810 with a standard deviation of 114.918 and a variance of 13206.189.

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Number of items in scale: 107
Number of items with zero variance: 0
Number of valid cases: 110
Number of cases with missing data: 0
Missing data were deleted: casewise

SUMMARY STATISTICS FOR SCALE
Mean: 790.81090909
Sum: 86989.200000
Standard Deviation: 114.91818497
Variance: 13206.189238
Skewness: -1.838565483
Kurtosis: 5.334168369
Minimum: 259.00000000
Maximum: 972.00000000
Cronbach's alpha: .953504038

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Figure 1 Cronbach's alpha
Source: Own elaboration

Results

The following are the results of the research carried out by means of parametric analysis of the survey instrument and organized in four sections corresponding to the different statistigraphs that were applied, where from each of them tables were obtained describing the results shown in them.

Univariate

Univariate statistics offers techniques of very frequent use in the processing of information when investigating a single event, or several events independently. These techniques are diverse, each one having a particular procedure, being of particular importance the preparation associated with the criteria of selection, application and interpretation of the diversity of methods of analysis in statistics, particularly univariate analysis. Univariate analysis methods are used to examine and analyze the behavior of individual variables.

To carry out the univariate analysis, the database previously captured in Excel was loaded into the STATISTICA 10 program in order to obtain the measures of central tendency, which make it possible to estimate the average behavior of each variable, with the mode, median and mean being the three most commonly used processes.

Mean: expresses the average value of the variable.

Median: expresses the value of the distribution that divides the sample into two equal or approximately equal parts.

Mode: expresses the value of the most frequently mentioned response. In turn, the standard deviation is obtained, since measures of variability indicate the dispersion of the data on a scale of a certain measurement of the variable considered (Hernández-Sampieri, Fernández-Collado, & Baptista-Lucio, 2014). Hernández Sampieri defines standard deviation as the average of the deviation of the scores with respect to the mean. Thus, the greater the dispersion of the data around the mean, the greater the standard deviation.

Once the results of the processes described above were obtained, the variables were ordered to obtain the upper limit (Med/med+DESVStd) and the lower limit (Med/med-DESVStd), which makes it possible to estimate the behavior of each variable, not only in the two limits, but also in the average limit.

Upper limit

Upper Limit	N	X	Min	Max	S
Correcting your mistakes helps to facilitate learning	101	9.267	0.000	10.000	1.405
Practice makes perfect	101	9.262	0.000	10.000	1.635
He prefers to have mistaken pointed out to him to correct them.	101	9.236	0.000	10.000	1.619
Practical examples are the best way to learn	101	9.020	0.000	10.000	1.699
Assertive and timely feedback enhances learning	101	8.984	0.000	10.000	1.607
He is now a person with values and ethics	101	8.936	0.000	10.000	1.767
Relating new topics to familiar ones helps us to learn better.	101	8.911	0.000	10.000	1.582
Person with values and ethics BEFORE entering the career.	101	8.885	5.000	10.000	1.310
Master's degree or postgraduate teaching degree with professional experience in the teaching field	101	8.870	0.000	10.000	2.245
Fondness NOW for TV series or in Streaming	101	8.734	0.000	10.000	1.836
Working on evidence focused on practical work is a better way of learning	101	8.717	0.000	10.000	1.615
Interest in music NOW	101	8.693	0.000	10.000	2.140
Master's degree or postgraduate degree with Workshops equipped according to the subject matter	101	8.678	0.000	10.000	2.318

Table 2 Upper limit of the univariable
Source: Own elaboration

When analyzing the "Upper Limit" it is possible to observe that the surveyed subjects favor learning preferences that tend to a punctual feedback from the teacher about their areas of opportunity, as well as the realization of practices and the sample of practical examples that are directly related to the subject. In turn, they prefer the teacher to relate previous knowledge with new knowledge, since this pedagogical practice improves learning, which yields positive results regarding the application of transdisciplinarity as part not only of the pedagogical practice, but also of the curricular design for careers and graduate programs of this type. This practical approach is reflected in the decision to prefer a graduate program where the workshops are equipped in accordance with the programmed subjects. In turn, the preference for a physical teacher, although it appears as part of the "Middle Limit", is so close to the "Upper Limit" of the table that its relation to this point is evident.

Middle boundary

Most of the variables are concentrated in the middle limit; however, those variables close to the upper limit are relevant for their interpretation, since they show high means and complement this inference.

Medium Limit	N	X	Min	Max	S
With a physical teacher you learn better	101	8.579	0.000	0.000	1.770
A love of music BEFORE entering the race	101	8.541	0.000	0.000	2.047
Graduate degree w/academic areas appropriate to the subject area	101	8.496	0.000	0.000	2.455
Now a fan of animation	101	8.460	0.000	0.000	2.333
Now a movie buff	101	8.436	0.000	0.000	2.189
Fondness for TV or Streaming series BEFORE entering the race.	101	8.426	0.000	0.000	1.969

Table 3 Univariate Mean Limit

Source: Own elaboration

In another order of ideas, it is observed that the graduation profile favors that students improve their interest in the audiovisual medium towards the end of their studies, with topics such as music, TV series or Streaming appearing in the "Upper Limit". Such reading is favored by the fact that variables such as taste with animation and cinema "now" - i.e. towards the end of their professional preparation - although not at the upper limit, appear very close to it, showing a particularly high mean. The improvement in these indicators is reinforced when observing how "interest in TV series or Streaming BEFORE entering the career", although it resulted with a high average, is nevertheless within the indicators of the "Middle Limit" and not within the "Upper Limit" contrary to those already mentioned.

At the same time, it is interesting that although it does not appear in the upper limit, the fact that a Higher Education Institution has adequate academic areas for the subjects appears among the priorities for choosing a postgraduate program.

Lower Limit

In the "Lower Limit" there are interesting findings related to the "Entry Profile Axis", "Person Axis" and the axes related to the postgraduate program itself ("Postgraduate Curricular Design", "Postgraduate IES Axis" and "Postgraduate Motivation Axis"):

In relation to the "Entry Profile" it is interesting to note that in relation to the complex variable "Previous Knowledge" the students consider, in retrospect, to have had low levels of competence in aspects related to art such as drawing and painting, but also in geometry.

Although this is surprising given the nature of the career, it is consistent with the common perception of the professors of the career, since these are aspects that are usually worked on as areas of opportunity generation after generation in the first year of training.

Lower Limit	N	X	Min	Max	S
Drawing skills BEFORE entering the career	101	6.109	0.000	10.000	3.258
Preference for Graduate Studies focused on Entrepreneurship and Digital Marketing	101	6.047	0.000	10.000	3.284
Basic knowledge in geometrical applications BEFORE entering the career	101	5.955	0.000	10.000	2.654
Preference for a postgraduate degree where distance learning is provided	101	5.564	0.000	10.000	3.370
Study postgraduate to serve as an example in your family	101	5.515	0.000	10.000	3.709
The number of students per class or group influences the decision to study a postgraduate program	101	5.467	0.000	10.000	3.582
With a distance teacher you learn better	101	5.358	0.000	10.000	3.016
Preference for Postgraduate studies focused on Architectural Visualization	101	5.010	0.000	10.000	3.442
In need of psychologist or psychiatrist care DURING the race	101	4.792	0.000	10.000	4.512
Knowledge of painting techniques BEFORE entering the career	101	4.641	0.000	10.000	3.421
Need to work DURING your career to contribute to your income	101	3.559	0.000	10.000	3.967
Feeling Religious or Close to a Religion	101	3.339	0.000	10.000	3.406
Need care from a psychologist or psychiatrist, BEFORE entering the career.	101	2.726	0.000	10.000	3.827

Table 4 Lower limit of the univariate

Source: Own elaboration

Regarding the "Person Axis", it is interesting that few students needed the care of a psychologist or psychiatrist before or during their studies. It is also significant that few were forced to work during their professional training in order to contribute to the family income, which speaks of families with a certain economic stability of those students who manage to finish their degree. Finally, it is interesting that most of the students who finish their degree do not seem to feel close to any religion.

Finally, in relation to aspects of the postgraduate degree itself, the student seems little interested in Postgraduates focused on Entrepreneurship and Digital Marketing, as well as Architectural Visualization. In a different category, the students are not very interested in distance learning, since the two attributes focused on measuring this point appear in the "Lower limit": "Preference for a postgraduate course with distance learning" and "With a distance teacher you learn better".

In turn, the number of students per class does not seem to be relevant when choosing a postgraduate course. Finally, it is relevant that "To study a postgraduate degree to serve as an example in your family" is the lowest motivation to study a master's or postgraduate degree, being the only one of these that appears in the "Lower limit": "To study a postgraduate degree to serve as an example in your family".

Integrational (FACTORS)

The analysis used in this section dedicated to the integrational analysis was the Exploratory Factor Analysis (EFA), where there are no dependent and independent variables, likewise, this statistic examines all the variables as a whole, being currently one of the most widely used statistical techniques in the medical and social areas. (Méndez-Martínez & Rondón-Sepúlveda, 2012).

The statistic was applied to a total of 107 interval variables with a factor loading of .50, using Normalized Varimax Rotation.

The Varimax Rotation seeks to maximize the weights at the factor level; in other words, each variable is expected to be representative in only one of them, with the objective of minimizing to the maximum the number of variables within each factor (Méndez-Martínez & Rondón-Sepúlveda, 2012).

Below are the tables of the combinations grouped into factors with their reading.

Table 5 shows how the motivations for studying a postgraduate degree are strongly related both to pedagogical and didactic aspects of the postgraduate degree, and to the characteristics of the HEIs that offer it. This seems to denote a strong relationship between aspects such as the learning preferences of final-year students, highlighting their predilection for graduate programs that offer teachers with pedagogical and professional experience in their teaching area, where they work on practical evidence, whose facilities are adequate, spacious and with reliable Internet access; with the motivation per se to study a graduate program, all of the above seeming to be a motivation in itself that joins the variables listed in this Axis (motivation). At the same time, it is significant to observe how the highest values correspond to variables where the motivation to study a master's or postgraduate degree revolves mainly around professional growth, being better valued at work and learning to organize oneself combined with a high desire to stimulate creativity as a motivation.

N	Variable	Loading factorial	X
110	Postgraduate studies for the desire to move up the social ladder	0.649	6.764
110	Graduate studies to start a business	0.629	7.182
110	Study postgraduate to serve as an example in your family	0.568	5.518
110	Studying postgraduate studies to improve your job profile or CV	0.754	7.850
110	Postgraduate studies to achieve financial independence	0.729	8.267
110	Studying postgraduate studies for the desire to be better valued in a job	0.757	7.775
110	Postgraduate studies to build a network of professional contacts	0.762	7.273
110	Postgraduate studies for specialization in a professional area	0.749	8.323
110	Graduate study skills to improve Mexico	0.606	6.627
110	Postgraduate studies to discover new options for professional growth	0.773	7.818
110	Postgraduate studies to stimulate creativity	0.769	7.958
110	Graduate study for Getting used to achieving goals	0.753	7.350
110	Postgraduate studies to learn how to get organized	0.777	7.120
110	Postgraduate studies to polish social skills	0.710	7.077
110	Postgraduate studies to develop study habits	0.701	7.006
110	Reliable and fast Internet access influences the decision to study at a graduate level	0.573	7.262
110	Influences decision to pursue graduate studies in appropriate academic areas for the subject matter	0.699	8.528
110	Influences postgraduate decision to have equipped workshops for the subject.	0.550	8.686
110	Influences postgraduate studies Spacious university facilities	0.504	8.009
110	Influence of postgraduate studies on teachers w/teaching experience in their teaching field	0.538	8.876
110	Influence of postgraduate studies on teachers with pedagogical experience in the teaching field	0.584	8.354
110	Influence of studying a postgraduate program on teachers with varied didactic resources	0.603	8.275
110	Graduate study work on evidence focused on practical assignments	0.548	8.001

Table 5 Factor 1. Motivations and influences to study a postgraduate course
Source: Own elaboration

In Table 6 it is possible to observe how certain characteristics of the graduation profile related to mathematical competencies, facility for written expression and taste for cinema present strong relationships with the student's graduation profile, such as a strong taste for cinema at the time of graduation and the ability to carry out project planning and management.

Similarly, the taste for cinema in the last year of his career is related to the student as an organized person at school, which in some way could be interpreted as certain competencies of the transversal curriculum, such as self-management of his learning, organization of his activities, and responsibility in general, allow the student towards the end of his career to better enjoy cinema, improving his understanding of it.

N	Variable	Factorial loading	X
110	Basic knowledge in mathematical calculus BEFORE the race	0.718	6.590
110	Basic knowledge in physics BEFORE the race	0.691	6.251
110	Basic knowledge in geometry BEFORE the course of studies	0.584	5.914
110	Ease of written expression BEFORE entering the career	0.570	6.807
110	Movie buffs BEFORE entering the race	0.505	7.525
110	Perform project planning and management	0.580	7.205
110	NOW Movie buffs	0.591	8.391

Table 6 Factor 2. Entry Profile/Exit Profile
Source: Own elaboration

Of particular interest is Table 7, which relates the characteristics of the graduate and entry profile with the learning preferences of students in their final year of the animation career, allowing a better understanding of the curricular, pedagogical and didactic characteristics that a postgraduate course aimed at them should have.

N	VARIABLE	Factorial loading	X
110	NOW fondness for TV series or in Streaming	0.551	8.719
110	Teaching rich in digital tools leads to better learning	0.508	8.471
110	Assertive and timely feedback enhances learning	0.718	9.004
110	Working with evidence focused on practical work is a better way of learning	0.724	8.749
110	Relating new topics to familiar ones helps us to learn better.	0.727	8.936
110	Relating topics of one subject to those of another is a better way of learning	0.504	8.189
110	Practice makes perfect	0.718	9.277
110	Practical examples are the best way to learn	0.610	9.036
110	Correcting your mistakes helps to facilitate learning	0.743	9.273
110	Prefer to have mistakes pointed out to correct them	0.647	9.262

Table 7 Factor 3. Learning Preferences
Source: Own elaboration

Table 8 relates in a very interesting way for this study some of the most important graduation competencies of the career (designing and building the scene, as well as Visual Effects and multimedia production) with characteristics related to the emotional stability of the student, such as communication within the family and the high negative relationship with the need for psychological care before entering school that the students mention.

N	VARIABLE	Factorial loading	X
110	Communication within the family	0.560	7.300
110	Attention of psychologist or psychiatrist, BEFORE the race	-0.549	2.657
110	Attention of psychologist or psychiatrist to DURING the race	-0.579	4.627

Table 8 Factor 5. Exit Competencies and Emotional Stability
Source: Own elaboration

Table 9 is of particular importance for this research, since it relates a certain group of learning preferences, allowing us to infer that the 9th semester IAEV student is a predominantly Visual/Verbal student. This aspect should be taken into account in the curricular design.

N	VARIABLE	Factorial loading	X
110	Listening is the best way to learn	0.542	7.364
110	Reading and taking notes is the best way to learn	0.611	7.307
110	Watching tutorials is the best way to learn	0.511	8.274

Table 9 Factor 6. Learning Preferences
Source: Own elaboration

On the other hand, with a view to a more comprehensive explanation regarding the entry profile, Table 10 allows inferring how IAEV students tend to cover aspects in their profile that allow a better performance in graphics and mass media, since they tend to be observers of their environment, a situation that is related to a recognition as a creative being and knowledge of drawing and painting BEFORE entering the career.

N	VARIABLE	Factorial loading	X
110	Drawing knowledge BEFORE the course	0.686	5.782
110	Technical knowledge of painting BEFORE the race	0.596	4.379
110	Creative BEFORE the race	0.520	7.817
110	Observer of the environment BEFORE the race	0.523	7.674

Table 10 Drawing and Painting Competencies in the Entry Profile Table 10 Factor 7

Table 11 highlights the variable "Focus on Video Games" as the main thematic and professional interest for the final year IAEV student when choosing a master's degree, which would allow a better approach in the curricular design of a probable graduate program.

N	VARIABLE	Factorial loading	X
110	Video game hobby BEFORE the race	0.617	7.865
110	NOW fondness for video games	0.696	8.005
110	Study a postgraduate degree focused on Video Game Design and Development	0.588	7.022

Table 11 Factor 8. Video games as a factor in the choice of postgraduate studies
Source: Own elaboration

Table 12 complements Tables 7 and 9 focused on "Learning Preferences", which allows us to complete the inference regarding the inclinations for certain forms of teaching-learning-evaluation, in this case the clear predilection for on-site and face-to-face teaching over distance learning and curiously in turn with the teaching vocation as one of the strong points to be considered in the curricular design of a postgraduate degree in animation.

N	VARIABLE	Carga Factorial	X
110	Prefer a postgraduate course with face-to-face teaching	0.601	7.799
110	Postgraduate degree w/ subjects related to professional teaching practice	0.578	6.755
110	With a physical teacher you learn better	0.657	8.550

Table 12 Preference for face-to-face education
Source: *Own elaboration*

Correlations

Pearson's correlation coefficient is a test that measures the statistical relationship between two continuous variables. If the association between the items is not linear, then the coefficient is not represented adequately. The correlation coefficient can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association. That is, as the value of one variable increases, so does the value of the other. A value less than 0 indicates a negative association; that is, as the value of one variable increases, the value of the other decreases. To carry out Pearson's correlation it is necessary to fulfill the following:

The measurement scale should be an interval or ratio scale. The variables should be approximately distributed. The association should be linear. There should be no outliers in the data. Therefore, this statistic was applied to measure the magnitude of the relationship of the variables of the research phenomenon, in order to be able to use the relevance of the existing relationship between them. In the present investigation the level of significance of the correlation was $\alpha= 0.05$, applied to 107 interval variables which resulted in the relationship of the following tables:

Studying a postgraduate course to improve your job profile or CV	
Studying for a Master's or postgraduate degree out of a desire to move up the social ladder	0.654359
Would you study a Master's or postgraduate degree to start a business?	0.630637
Studying a postgraduate degree to serve as a role model in the family	0.454997

Table 13 Studying a postgraduate degree to improve one's CV has an impact on one's social standing
Source: *Own elaboration*

Interestingly, when considering the motivations for studying a postgraduate degree, respondents consider that the improvement in the Curriculum Vitae will impact the improvement of the social ladder, improving the possibilities of starting a business and therefore will have a positive impact on the family as an example to follow.

Studying a postgraduate degree out of a desire to be better valued in a job	
Studying for a Master's or postgraduate degree out of a desire to move up the social ladder	0.711512
Would you study a Master's or postgraduate degree to start a business?	0.598503
Studying a postgraduate degree to serve as a role model in the family	0.531310
Studying a postgraduate course to improve your job profile or CV	0.808165
Studying a postgraduate degree out of a desire for financial independence	0.709519

Table 14 Studying for a postgraduate degree helps to be valued at work and improve the economic situation
Source: *Own elaboration*

The interpretation of Table 13 is reinforced when observing in Table 14 the strong correlation between studying a postgraduate degree to be better valued at work in order to improve one's CV, climb the social ladder, and finally achieve economic independence and be able to start a business, positively impacting the family by being an example to follow.

Study a postgraduate course to Build a professional network	
Person with values and ethics NOW	0.523388
Ability to adapt positively to change in your environment NOW.	0.498752
Studying for a Master's or postgraduate degree out of a desire to move up the social ladder	0.617933
Would you study a Master's or postgraduate degree to start a business?	0.671447
Studying a postgraduate degree to serve as a role model in the family	0.592227
Studying a postgraduate course to improve your job profile or CV	0.635492
Studying a postgraduate degree out of a desire for financial independence	0.656630
Studying a postgraduate degree out of a desire to be better valued in a job	0.695308

Table 15 Postgraduate studies, ethics, adaptability and professional contacts
Source: *Own elaboration*

Table 15 relates the motivation to study a postgraduate degree wishing to build a network of professional contacts to improve one's CV and position at work with positive aspects of the respondent's personality such as being an ethical person, able to adapt to his/her environment.

Studying a postgraduate degree out of a desire to discover new options for professional growth	
Person with values and ethics NOW	0.493730
Studying for a Master's or postgraduate degree out of a desire to move up the social ladder	0.704938
Would you study a Master's or postgraduate degree to start a business?	0.641600
Studying a postgraduate degree to serve as a role model in the family	0.512936
Studying a postgraduate course to improve your job profile or CV	0.704717
Studying a postgraduate degree out of a desire for financial independence	0.686625
Studying a postgraduate degree out of a desire to be better valued in a job	0.779626
Study a postgraduate course to Build a professional network	0.769201
Studying a postgraduate degree to specialize in a professional area	0.742063
Studying a postgraduate degree out of a desire to Have skills to improve Mexico	0.594838

Table 16 Postgraduate studies for professional growth and specialization
 Source: Own elaboration

Closing the motivations axis, it is relevant with a high degree of correlation, that students in the last year of IAEV consider that the study of a graduate degree will not only help them to grow professionally by specializing in a specific area, which they hope will result in the characteristics seen in the previous tables: better CV, improved employment status, economic independence and therefore the possibility of starting a business, but also impact on the respondent to be a factor of favorable change in turn for Mexico. This infers that the respondent not only thinks about his own well-being and that of his family, but also that of the nation (Table 16).

Table 17 is relevant because it links the interest in studying a postgraduate degree with academic areas appropriate for the subject being studied with motivational aspects already analyzed, such as improving one's CV, improving one's social standing and starting a business, with soft skills such as the desire to develop study habits, learn to organize oneself, polish social skills, stimulate creativity and achieve goals.

Studying a postgraduate course with appropriate academic areas for the subject matter	
Studying for a Master's or postgraduate degree out of a desire to move up the social ladder	0.546635
Would you study a Master's or postgraduate degree to start a business?	0.503254
Studying a postgraduate course to improve your job profile or CV	0.629705
Studying a postgraduate degree out of a desire for financial independence	0.670350
Studying a postgraduate degree out of a desire to be better valued in a job	0.668013
Study a postgraduate course to Build a professional network	0.613590
Studying a postgraduate degree to specialize in a professional area	0.708218
Studying a postgraduate degree out of a desire to Have skills to improve Mexico	0.502482
Studying a postgraduate degree out of a desire to discover new options for professional growth	0.708964
Studying a postgraduate degree out of a desire to Stimulate creativity	0.709963
Studying a postgraduate degree out of a desire to Achieve goals	0.698882
Studying a postgraduate program for the desire to learn how to get organized	0.622994
Studying a postgraduate degree for the desire to polish social skills	0.615374
Studying postgraduate studies for the desire to develop study habits	0.630032
Study a postgraduate course with reliable and fast Internet access	0.574914

Table 17 Graduate studies in HEIs with adequate academic areas improve soft skills
 Source: Own elaboration

Comparative t-Student

The test known as t-Student is based on two premises: a) on the normality distribution, and b): on the samples being independent. This statistical tool makes it possible to compare samples, $N \leq 30$ and/or establishes the dissimilarity between sample means. Developed by William Sealy Gosset under the pseudonym "Student" (Student), it was initially designed with the objective of examining the differences between two independent and small samples having normal distribution and homogeneity in their variances (it should be noted that, in the original article, the author does not define what a large and/or small sample is). Gosset emphasizes the normality of both samples as crucial in the development of the test (Sánchez-Turcios, 2015).

In other words, the t-Student is a statistical process that facilitates the assessment, appreciation or quantification of the significant difference that may occur between the means of two samples or groups in a variable; using a model of deductive or inferential statistics, which allows assuming or establishing whether the dependent variables disagree with each other, symbolizing through its t-value the number of units that separate the means of both samples. For the above described, the application of this exploratory statistic was carried out in order to know in the dependent variable of Gender those variables whose results are significant of the qualities that this study measured. The "t" comparison test for independent samples was performed with a significance value of $p \leq 0.05$, the analysis was made to a sample of 110 subjects of which 58 are men (Group 1) and 46 are women (Group 2), with 6 individuals identifying themselves as "OTHER". For practical purposes, it was decided to proceed with the comparison on the basis of the "male" and "female" genders, as these are the most significant, statistically speaking. The results of this exploration are shown in the following five tables, grouped according to the research axes explored where these variables appear.

Table 18, related to the "Person Axis", shows in the first place a significant increase in the number of fathers of men with a taste for reading novels, stories and literature in general. At the same time, this gender shows a greater tolerance to frustration in the last stretch of their careers compared to women. As a complement to this, it is very interesting that the female gender shows a greater tendency to visit a mental health professional, particularly before entering the career.

SIMPLE VARIABLES	T-test; Grouping: Student gender				
	Mas	Fem	Valor-T	df	p
At least one of the dads likes to read regularly.	6.931	5.413	2.457	102	0.016
Stress and Frustration Tolerance NOW	6.945	5.717	2.078	102	0.040
Attention of psychologist or psychiatrist, BEFORE the race	1.514	3.772	-3.239	102	0.002
Attention of psychologist or psychiatrist to DURING the race	3.569	5.652	-2.372	102	0.020

Table 18 Person Axis
Source: Own elaboration

In relation to the student profile (Table 19), the woman manifests having a set of competencies, skills and tastes usually at a better level than her male counterpart BEFORE entering the career: knowledge in drawing, painting, observers of the environment, fondness for reading, responsible and ethical person.

Some of these points are reinforced by the fact that women like to read before and towards the end of their studies in a considerably higher percentage than men (more than 3 percentage points). A similar result is observed - albeit with a lower percentage - with respect to women perceiving themselves as a person with ethics in both chronological moments: before and towards the end of their studies. A notorious -and expected- positive difference results in the fondness for video games on the part of male students before and towards the end of the course, reinforcing the perception of men as the gender that most enjoys this activity.

SIMPLE VARIABLES	T-test; Grouping: Student gender				
	Mas	Fem	Valor-T	df	p
Drawing knowledge BEFORE the course	5.052	6.739	-2.601	102	0.011
Knowledge of painting BEFORE the race	3.753	5.217	-2.230	102	0.028
Observer of the environment BEFORE the race	7.255	8.246	-2.280	102	0.025
Love of reading (novels, short stories, etc.) BEFORE the race	5.505	7.467	-3.549	102	0.001
Video game hobby BEFORE the race	9.217	5.989	6.528	102	0.000
Responsible person with your learning BEFORE the race.	7.159	8.054	-2.168	102	0.032
Person with values and ethics BEFORE the career	8.541	9.272	-2.922	102	0.004
NOW love to read -novels, stories, books-	6.319	7.935	-3.108	102	0.002
NOW fondness for video games	8.957	6.696	4.214	102	0.000
NOW a person with values and ethics	8.621	9.337	-2.111	102	0.037

Table 19 Entry and exit profile
Source: Own elaboration

In relation to the motivation to study a postgraduate course (Table 20), significant differences between genders are observed, since women seem more focused on improving their work and professional possibilities by studying a postgraduate course, with averages above 8 compared to men whose averages are around 7 or less in aspects such as: improving their work profile, economic independence, being better valued at work, building a network of professional contacts, specialization in a professional area, studying a postgraduate course to become accustomed to achieving goals and learning to organize themselves better.

VARIABLE	T-test; Grouping: Student gender				
	Mas	Fem	Valor-T	df	p
Studying postgraduate studies to improve your job profile or CV	7.129	8.978	-3.381	102	0.001
Postgraduate studies to achieve financial independence	7.731	9.022	-2.414	102	0.018
Studying postgraduate studies for the desire to be better valued in a job	7.134	8.750	-2.805	102	0.006
Postgraduate studies to build a network of professional contacts	6.560	8.402	-3.435	102	0.001
Postgraduate studies for specialization in a professional area	7.819	9.152	-2.612	102	0.010
Graduate study for/ Getting used to achieving goals	6.871	8.239	-2.404	102	0.018
Postgraduate studies to learn how to get organized	6.534	8.033	-2.526	102	0.013

Table 20 Postgraduate Motivation Axis
Source: Own elaboration

Regarding the characteristics that a Higher Education Institution should have, as a way of influencing the decision to study a postgraduate course, women once again seem to be the ones who think in a more practical way in relation to men, since the surveyed women show that the technological and pedagogical conditions of the HEI that offers a postgraduate course should be optimal to be attractive, in such a way that the "T-value" is usually higher than 2.5 percentage points in the average, giving particular importance to the Internet and the workshops equipped according to the subject (Table 21).

VARIABLE	Prueba T; Agrupamiento: Género alumno				
	Mas	Fem	Valor-T	df	p
Reliable and fast Internet access influences the decision to study at a graduate level	6.578	8.463	-3.384	102	0.001
Influences decision to pursue graduate studies in academic areas suitable for the subject matter	8.214	9.211	-2.390	102	0.019
Influences postgraduate decision to have equipped workshops in accordance with the subject matter.	8.164	9.391	-3.007	102	0.003
Influences postgraduate studies Spacious university facilities	7.621	8.609	-2.056	102	0.042
Influence of postgraduate studies on teachers w/professional experience in their teaching area	8.483	9.443	-2.385	102	0.019
Influence of postgraduate studies on teachers with pedagogical experience in their teaching field	7.912	9.065	-2.383	102	0.019

Table 21 IES Axis

Source: Own elaboration

Finally, when studying the thematic interests, as well as potential contents, pedagogical and didactic strategies in the curricular design of a postgraduate degree in animation, it is possible to observe a greater interest in women to study postgraduate degrees with a focus on teaching by competencies, giving particular importance to the school environment and whose subject matter is focused on Conceptual Art, Storyboarding, 2-D Animation and Cinematography. While the male gender prefers a postgraduate degree focused on Video Game Design and Development, which is in accordance with the results of the Entry and Exit Profile table.

In turn, the female gender manifests having a learning profile in animation mostly auditory-visual-social, which is reinforced in the statement regarding how reading and taking notes improves their learning (Visual/Verbal Students) as well as experiences and conversing in a group is better learned (Auditory/Verbal Students), where the differences between the measured variables are higher than 2 percentage points with respect to the male gender.

VARIABLE	T-test: Grouping: Student gender				
	Mas	Fem	Valor-T	df	p
Postgraduate studies w/ competency-based education	6.300	7.478	-2.055	102	0.042
University school environment on the decision to pursue graduate studies	7.388	8.543	-2.459	102	0.016
Study a postgraduate degree focused on Video Game Design and Development	7.843	6.076	2.860	102	0.005
Postgraduate Studies in Conceptual Art, Storyboarding and 2-D Animation	7.176	8.326	-2.119	102	0.036
Postgraduate studies focused on Cinematography	7.133	8.283	-2.235	102	0.028
Observing is the best way to learn	7.767	8.728	-2.306	102	0.023
Listening is the best way to learn	6.810	8.239	-2.783	102	0.006
Reading and taking notes is the best way to learn	6.953	7.967	-2.122	102	0.036
Sharing experiences and conversing in a group is a better way of learning	7.998	8.848	-2.218	102	0.029

Table 22 Axes Graduate Curricular Design/Learning Preferences

Source: Own elaboration

Discussion and Conclusions

The methods developed by Statistics constitute an important instrument for scientific study, so they can be applied in different fields of knowledge, among them the social sciences, one of them being educational research, where statistical techniques are particularly useful in positivist research and, specifically, in the data analysis phase, where it is possible to infer relationships between phenomena, populations and specific contexts (Gil-Flores, 2003). Such is the case of the present research, where we proceeded to the study of a social phenomenon, in this case trying to elucidate the profile of entry and exit of the student of the Animation and Visual Effects Engineering, as well as their learning preferences, with a view to the possible curricular design of an ex professo graduate program for the graduates of this professional career. Therefore, questions related to the possible motivations and inherent professional approach were also asked, through the use of a survey instrument, which gave numerical data collected on a reality or a context, obtaining products from its processing through the application of a systematic work method. The results revealed the following points:

Undergraduate Entry Profile: the IAEV applicant shows interest in TV or streaming series, as well as in music BEFORE entering the career, with a high average, but not enough to appear in the upper limit of the univariate. On the other hand, students consider, in retrospect, to have had low levels of proficiency in art-related aspects such as drawing and painting, but also in geometry.

This, although surprising given the nature of the career, is consistent with the common perception of IAEV teachers, being aspects that are usually worked as areas of opportunity in the first year of training of each generation. In turn, and in another vein, it is interesting that students who reach the last cycle of training, declare not having needed attention from a psychologist or psychiatrist before or during the career, which could mean that those with such a need usually do not reach the end of their professional training.

Finally, towards a more comprehensive explanation regarding the entry profile, IAEV students contain elements in their profile that allow a better performance in graphics and mass media because they are usually observers of their environment, a situation that is related to a recognition as creative beings, as well as an interest in drawing and painting BEFORE entering the career -although as explained above, with a low average-.

Professional Graduation Profile: the graduation profile favors that students improve their interest in the audiovisual medium towards the end of their studies. It is significant that few students were forced to work during their professional training to contribute to the family income, which speaks of families with a certain economic stability in the students who manage to finish their degree. On the other hand, the taste for cinema in the last year of their career seems to be related to certain competencies of the transversal curriculum, such as self-management of their learning, organization of their activities, and responsibility in general, which would allow the student to better enjoy cinema, improving their understanding of it towards the end of their career. Some of the most important graduation competencies of the career (scene design and construction, as well as Visual Effects and multimedia production) seem to be related to characteristics linked to the emotional stability of the student, such as communication within the family and the high negative relationship with the need for psychological care before entering school mentioned by the students.

Pedagogical practices and learning preferences: IAEV students favor face-to-face teaching over distance learning. In turn, they prefer to learn by doing practicals and showing practical examples directly related to the subject and professional praxis. In this regard, they prefer the teacher to relate previous knowledge with new knowledge, which yields positive results regarding the application of transdisciplinarity as a pedagogical practice not only in the improvement of learning, but also as part of the curricular design for careers and postgraduate studies related to art.

On the other hand, a certain group of learning preferences ("Listening learns better", "Reading and taking notes learns better" and "Watching tutorials learns better") are related in a way that allows inferring that the 9th semester IAEV student is a predominantly Visual/Verbal student. This aspect should be taken into account in curriculum design.

Although there are useful differences between both genders: the female student manifests to have a learning profile in animation mostly auditory-visual-social, which is reinforced in the statement regarding how reading and taking notes improves their learning (Visual/Verbal students) as well as experiences and conversing in group one learns better (Auditory/Verbal students), where the differences between the measured variables are higher than 2 percentage points with respect to the male gender.

Evaluation: the IAEV student favors learning preferences tending to a punctual feedback from the teacher about their areas of opportunity.

Motivation to study a postgraduate degree: "To study a postgraduate degree to serve as an example in your family" is the lowest motivation to study a master's or postgraduate degree. While the highest values for the male gender correspond to variables where motivation revolves mainly around the improvement of the work profile or CV, professional growth, being better valued at work and learning to organize oneself combined with a high desire to stimulate creativity.

For women, aspects such as "studying a postgraduate degree to achieve economic independence", "specializing in a professional area" and "building a network of professional contacts" seem to be the main motivations.

Higher Education Institutions: this practical approach is reflected in the decision to prefer a postgraduate program where the offering HEI has equipped workshops in accordance with the programmed subjects, as well as adequate academic areas for these subjects and reliable internet access. Interestingly, these points are of particular importance for women.

Postgraduate curricular design: the student seems little interested in Postgraduates focused on Entrepreneurship and Digital Marketing or Architectural Visualization. With the variable "Focus on Video Games" as the main thematic and professional interest - particularly for men-, and curiously with the teaching vocation as the strong points to consider in the curricular design of a postgraduate degree in animation. Women, on the other hand, favor a postgraduate degree with a focus on "Conceptual Art, Storyboarding, 2-D Animation and Cinematography". At the same time, women show particular interest in studying postgraduate programs focused on teaching by competencies.

Thus, the points mentioned above would allow in a second stage to methodically attend to the offer and design not only of postgraduate courses, but also of continuing education, such as specialization courses and diploma courses.

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