

# Satisfacción de los estudiantes en un curso propedéutico de matemáticas en e-modalidades

## Satisfaction of the students in a preparatory course of mathematics in e-modalities

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### RESUMEN

#### Palabras clave

Satisfacción con los estudios, TIC, educación virtual, educación semipresencial

El objetivo de la investigación de la cual procede este trabajo fue analizar la satisfacción de los estudiantes con el curso propedéutico de matemáticas avanzadas, en modalidades *e* y *b-learning*, de una maestría en electrónica en una institución de posgrado del Tecnológico Nacional de México. El análisis de la satisfacción se realizó con base en la teoría de la disconfirmación de expectativas, y las categorías para el análisis se retomaron de la teoría de la idoneidad didáctica. La investigación se diseñó como un estudio de caso, con alcance exploratorio y descriptivo. Para la valoración de la satisfacción de los estudiantes, utilizamos dos cuestionarios en línea, uno antes de iniciar el curso para conocer sus expectativas y otro al final para valorar la satisfacción. Aplicamos entrevistas semiestructuradas a los estudiantes y al docente que impartió el curso y observación no participante durante la modalidad *e-learning* para la triangulación de datos. Aunque el estudio se realizó con un solo grupo, los resultados preliminares muestran que los estudiantes, a pesar de las limitaciones materiales y afectivas durante el curso, presentan un alto grado de satisfacción con este. Las categorías de análisis son adecuadas para el análisis de cursos de matemáticas en estas modalidades.

### ABSTRACT

#### Keywords

Course satisfaction, ICT, e-learning, b-learning

*The aim of this work was to analyze student satisfaction with a preparatory course in advanced mathematics, in e-learning and b-learning modalities, in a master's degree in electronics, in a graduate institution of the National Technological of Mexico. The satisfaction analysis was carried out based on the Disconfirmation of Expectations Theory and the categories for the analysis were taken from the Theory of Didactic Suitability. The research was designed as a case study, with exploratory and descriptive scope. To carry out the assessment of student satisfaction, two online questionnaires were applied, one before starting the course to know their expectations and another at the end to assess satisfaction. Semi-structured interviews were conducted with the students and the teacher who taught the course and non-participant observation was carried out during the e-learning modality, for data triangulation. Although the study was carried out with only one group, the preliminary results show that the students, despite the material and affective limitations during the course, have a high degree of satisfaction with it. The categories of analysis are suitable for analysis of math courses in these modalities.*

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## INTRODUCTION

The assessment of students' satisfaction with their plans and programs of study represent some of the new challenges our modern society posed to universities. Higher Education institutions (HEIs) are facing different problems; Mexican HEIs, in particular, are dealing with two special and pressing issues: the “changes in the demographic structure, increase in the number of private universities, existence of other more attractive educational alternatives, etc.”, (De la Fuente, Marzo y Reyes, 2010, p. 1) and “the development of information and communication technologies” (García, Gil y Berenguer, 2015, p. 28) that implies greater national and international mobility.

The context forming “globalization, internationalization, virtualization and relocation” (Salinas y Martínez, 2007, p. 164) is producing a greater level of competition among HEIs. This implies that universities must design strategies to face these new challenges and develop a reflective attitude in transforming themselves.

The approach of assessing student satisfaction, the globalization and internationalization of education are producing changes and adaptations in educational institutions, such as the use of ICTs to develop and deliver courses (in *e* and *b-learning* modalities) which have generated new educational practices and academic settings in which “ICTs entail an authentic element of added value and play an essentially transforming role” (Coll, Mauri and Onrubia, 2008, p. 5).

Although every institution assesses the function of its curriculum and of the courses delivered or uses assessment guides or rubrics for the courses (Quality Matters, 2014), in general, institutions assess the infrastructure components, curricular coherence, the teachers' pedagogical efficiency, the adequate use of the platforms, *etcetera*. There are very few studies on the satisfaction of the participants in *e-learning* or *b-learning* courses and even less on mathematics for engineering.

One of the difficulties for this type of studies is the association of the concept of satisfaction with the business sector, of products and services, from different theories of the economy (Isac & Rusu, 2014) and psychology (Abarca, Cáceres, Jiménez, Moraleta and Romero, 2013), that theorizes on the subjects' motivations (expectations) and how they react toward the compliance or not of a specific product or service when confronted with the reality.

Studies on the satisfaction at different educational levels have been conducted and different aspects have been considered, e.g., the students' satisfaction with their academic achievement and its correlation with the classroom activities with the teacher (Paechter, Maier and Macher, 2010). Other research associate students' satisfaction with the quality of

educational services (Fernández, Fernández, Álvarez and Martínez, 2007), in relation with both pedagogical and infrastructure aspects.

The association of satisfaction, quality and academic success is a constant in the work developed by Hernández, Lara, Ortega, Martínez and Avelino (2010). This concept of quality adopts a different dimension in the work of Salinas and Martínez (2007), who define it as a key factor for the survival of universities. On the other hand, the work of Folgueiras, Luna and Puig (2013), points out that students' satisfaction involves the possibility of transferring the classroom knowledge to real situations.

The lack of a definition of satisfaction and its associated dimensions as well as the heterogeneity of methodologies and instruments used for its study is one of the problems the aforementioned essays on face-to-face education reveal.

In works related with the assessment of distance courses such as the work of Llarena and Paparo (2006), "the interaction between the different stakeholders of an educational process and the interactivity of the student with the learning material and technology" (p. 2) is assessed.

More recently, Cabero, Llorente and Puentes (2010) introduce, as assessment element, the participants' expectations toward the course, and for the satisfaction analysis they apply a questionnaire which categories include the teacher, the platform, the contents and the materials. These works, as for those delivered in a face-to-face modality, and in studies of satisfaction outside the educational environment, consider different categories related to the quality variables and their different interpretations as well as the academic achievement of the participants in different courses.

Currently located in Cuernavaca, Morelos, the Centro Nacional de Investigación y Desarrollo Tecnológico (Cenidet, [Spanish acronym for The National Center for Research and Technological Development]), a postgraduate institution of the National Technological Institute of Mexico, is aiming at expanding its educational offer, and is about to offer an online electronic engineering program. As initial action, and based on the requirements of the admission processes to quality postgraduate programs of the National Science and Technology Council, a distance mathematic propaedeutic course is being offered since most of the students of this Center are from out-of-town or foreigners; hence, this course is first given in an *e-learning* modality followed by a *b-learning* course. Therefore, this course must be evaluated from different perspectives. The general objective of this research in particular was to assess if the students' academic expectations about this type of course were met in such a way that its results would contribute to the design of future postgraduate engineering courses presented through the Cenidet *e-learning* modality.

## THEORETICAL APPROACH

The satisfaction and expectation constructs are associated with the assessment of quality. Its use began in the entrepreneurial sector, more specifically in the field of marketing to relate the improvement in the quality of service or product offered with positive impact on consumers.

The satisfaction and disconfirmation theory is one of the most used in the area of marketing and services. It defines satisfaction as a post-election assessment judgment related to a specific purchase decision and as a result of the disconfirmation (Parasuraman *et al.*, 1985, 1988, quoted by Kumbhar, 2010). This theory suggests that satisfaction is determined by the intensity and the positive or negative directions of the gap existing between expectations and the performance perceived (See Figure 1).



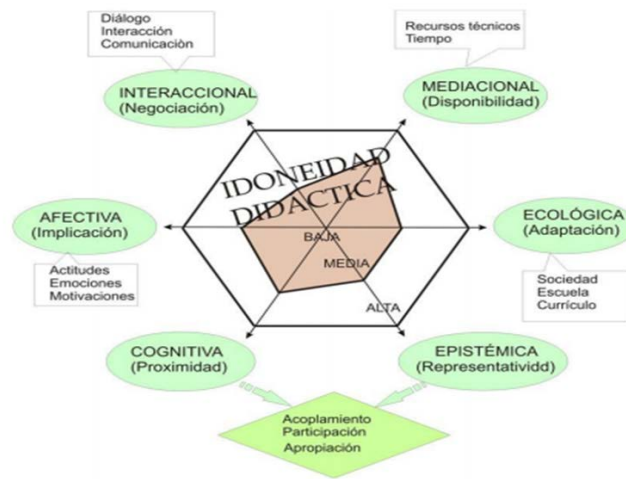
**Figure 1.** Confirmation and Disconfirmation Process.  
Source: Adapted and translated from Boshoff, 1997, p. 22.

Currently, these concepts are retaken and adjusted to education by using the “Assessment of the quality in education” approach, which emerged in the United States in the ‘80s and arrived subsequently in the European Union (Hernández *et al.*, 2010) and spread worldwide.

For the study of the student’s satisfaction of a mathematic propaedeutic course, we retook the expectation and satisfaction constructs with the course and, to study them, we retook the dimensions of the theory of didactic suitability (Díaz, Batanero & Font, 2007): epistemic, cognitive, interactional, mediational, affective and ecological.

Figure 2 describes a representation of didactic suitability:

The external regular hexagon corresponds to an intended or planned process of study through which, *a priori*, the highest suitability in each of the categories is attained.



**Figure 2.** Didactic suitability and its categories.  
Source : Diaz, 2010, p. 6.

The internal irregular hexagon corresponds to the suitability levels effectively attained in implementing a study process. It situates the epistemic and cognitive suitability at the base, considering that the study process revolves around the development of specific knowledge.

In this research, we will conduct a satisfaction study of students participating in a mathematic propaedeutic course presented through the *e-learning* and *b-learning* modalities, based on the expectation and satisfaction constructs and the dimensions of the theory of didactic suitability, object of study of this research.

## METHODOLOGICAL APPROACH

Given the singularity of the propaedeutic course of the Cenidat Master's degree in Electronic (*e-learning* and *b-learning* modalities), in addition to the *sui generis* interpretation of both modalities by the teacher in charge and the geographic distribution of its participants and based on the constructs expounded in the theoretical approach, we consider using the qualitative case study research method.

In order to study satisfaction, we resorted to the interview, questionnaire and non participative observation. Before the course, we interviewed the teacher and the candidates afterwards. We applied two questionnaires at the Likert scales, an initial questionnaire on the expectations and a final one on the satisfaction about the course. The non-participative observation was carried out during the course. We analyzed the qualitative

data obtained by means of Atlas.ti and we triangulated them with those of the questionnaires which we tabulated by means of descriptive statistics.

In this study, we considered at least three elements: the teacher, who designed and coordinated the two modalities of the propaedeutic course and who has an extensive experience in face-to-face courses but no experience in virtual settings, the electronic master's degree candidates, and the course itself.

There were 24 participants in the propaedeutic course located in Cuba and in Mexico. There were six Cubans (five men and one woman) between the ages of 25 and 29. There were 18 Mexicans (15 men and three women) between the ages of 22 to 29. Most of the participants had previously studied mechatronic or electronic engineering. Only three of them referred having experience at distance course using Blackboard and Moodle virtual learning settings for four to six months.

The course was designed to be delivered in two different modalities: the first part (three weeks) through the *e-learning* modality given the participants' geographic distribution. The second part (two weeks) was delivered through the *b-learning* modality since the candidates were at the Cenedet.

## RESULTS

The results will first show the considerations made by the teacher – in comparison with the theory of didactic suitability –when designing a course through the *e* and *b-learning* modalities. Subsequently, we present the results of the questionnaires that enquire on the expectations and the satisfaction of the students about the course.

### *Differences between the teacher's considerations for the design of the course and the didactic suitability*

The hermeneutic analysis by means of Atlas.ti identified in the teacher's narrative that the objective of the course can be linked to the following codes: languages (epistemic suitability), adaptation of the curriculum (ecologic suitability), and learning (cognitive suitability). The teacher expresses these elements as follows:

... that they can operate more or less efficiently with the concepts proper to each unit and to operate more or less efficiently means that: they know the concept and can use it to solve a problem in a specific amount of time, but now the thing is, it can be algebra or differential calculus or integral calculus of linear algebra. The objective of the course is that the students know the concept of each one of these topics and can operate with it and solve problems in a specific amount of time (Hernández, 2017).

However, in the operation of the course, we observed that the teacher omitted explaining this objective, as recorded in the field log: "...the objectives and tools are not explained clearly in the work plan and the contents of the course; the topics to be developed and the bibliography are the only ones detailed. The materials sent by the teacher by e-mail include: " a) the objective, b) the files to be revised and answered by the students, c) the activities to be developed, and d) the items necessary to accredit the task, date of issuance and deadline to submit the task" (Hernández, 2017).

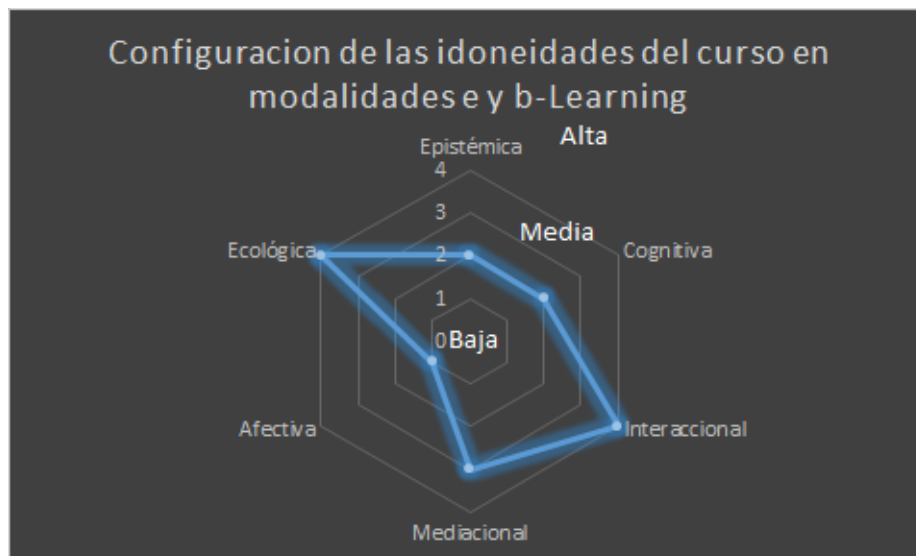
The contents specification is associated with the following codes: situations-problems (epistemic suitability), curricular adaptations to individual differences (cognitive suitability), socio-professional and cultural adaptations (ecologic suitability), attitudes (affective suitability) and teaching time (meditational suitability); these are included in the work plan and not separately. The plan does not give any definitions, explicit topic procedures, or mathematical contents (problems, definitions or propositions) interrelated or interconnected.

The *e* and *b-learning* courses activities are associated with the following codes: situations-problems (epistemic suitability), adaptation to the curriculum (ecologic suitability), educator-learner interaction, students-autonomy interaction (interactional suitability). These show the curricular adaptations made by the teacher according to the students' geographic differences ("...Cuban participants received e-mails different from those received by the Mexican participants; hence, they carried out tasks specific to their country...") and providing situations that generated problems requiring the students to make conjectures, interpret and justify the solutions. Furthermore, in both cases, the teacher generates spaces allowing the students to do the exercises.

The interaction code between students (interactional suitability) was not found in the online course modality which only used e-mail and Dropbox; hence, the communication among participants and the group inclusion were not benefited.

The course assessment can be linked to the following codes: prior knowledge (cognitive suitability), adaptation to the curriculum (ecologic suitability) and formative assessment (interactional suitability); even though the assessments applied by the teacher to the students are not explained beyond the compliance with the deadline to submit the tasks and exercises.

In this brief revision, we can observe the differences between the design and the operation of the course and their relation with the theoretical categories of didactic suitability. In Figure 3 (Díaz, 2010) the hexagon built based on the number of codes per category found in the Atlas.ti analysis, shows the *suitabilities* identified in the design and the practice of the course as well as their distance with the theoretical model of the didactic suitability.



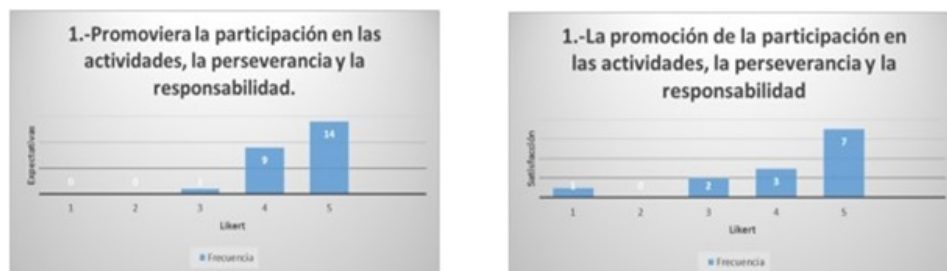
**Figure 3.** Distance between the *e* and *b-learning* courses, and the theoretical categories of didactic suitability.  
Source: Self development.

### EXPECTATIONS AND SATISFACTION OF THE CANDIDATES

As in the analysis of the teachers' interviews, we analyzed the questionnaires by taking into account the general categories of expectations and satisfaction, but taking the dimensions of the didactic suitability to determine which of them the participants considered satisfactory. The two questionnaires were structured according to the Likert type scale, with values from 1 to 5 that represent the levels of expectations or the degree of satisfaction of the students in regard to the course.

Based on the data obtained in the questionnaires, we conducted the statistic descriptive analysis to establish in which aspects of the didactic suitability did the participants' satisfaction get closer or not to their expectations. As in the analysis of the design and operation of the course, we first examined the results of the epistemic suitability, followed by the cognitive, interactional, mediational, affective and ecologic suitability.

In general, we proceeded as follows: we grouped the data per category of each one of the questionnaires and according to the responses of the candidates, and we made a graph based on the mode of the results of each questionnaire. We carried out this comparison for each category according to the guidelines of the disconfirmation theory; the objective was to see the difference between the participants' expectations and their satisfaction. Figure 4 shows an example of what we did for each one of the questions and the codes they cover.



**Figure 4.** The left histogram shows the expectations, and the right one, the satisfaction of the participants in the epistemic category.  
Source: Personal development.

As we observe in Figure 4, the responses to question 1 of both questionnaires (corresponding respectively to languages and rules), 14 of the students in the questionnaire on expectations, and seven in the one on satisfaction, chose option 5 (strongly agree). Therefore, the categories of epistemic suitability were adequate to represent their expectations about the mathematical language they expected to find in the course, as well as for the definitions and the procedures, clear and adapted, to the level at which the students are.

According to the disconfirmation theory of expectations, there are no significant differences between their expectations and their experience since in both cases, the mode was 5 (strongly agree) for expectations and 5 (completely satisfied) for satisfaction.

These results contrast with those obtained from the final students' interviews, but they are consistent with their claims; "Yes. The schedules, the facilities, including the classroom were good. Yes. I am satisfied" (Hernández, 2017).

Based on this analysis procedure, we reached the results contained in the following table.

**Table.** Mode of the results of the questionnaires

Suitability	Expectations	Satisfaction
Interactional	5	5
Mediational	5	5
Ecologic	5	5
Epistemic	5	5
Cognitive	5	5
Affective	5	4

Source: Self development.

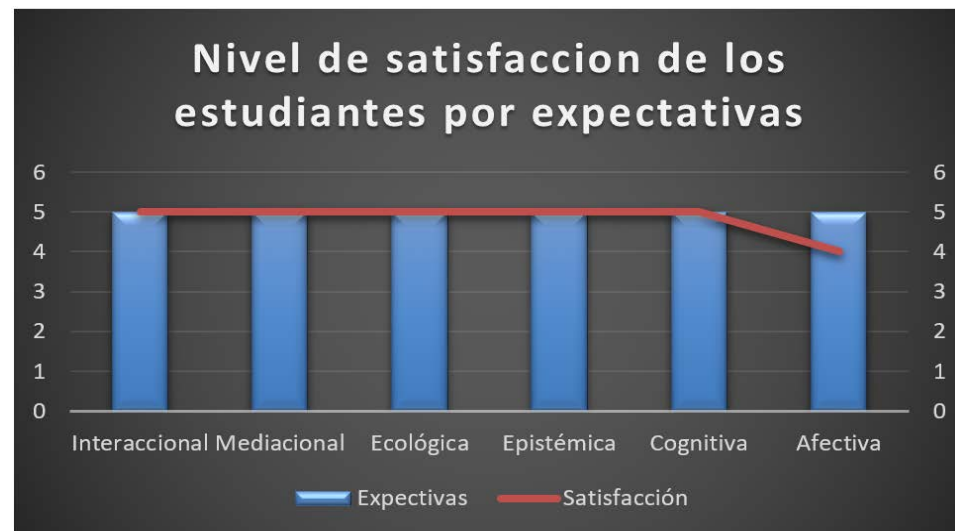
Díaz' graph (2010), shows the theoretical configuration of the didactic suitability. Figure 5 shows the data of the students' expectations and their

satisfaction with the course in each one of the categories of didactic suitability.



**Figure 5.** Graph of expectations and satisfaction of the students based on the categories of didactic suitability.  
Source: Self development.

Lastly and according to the disconfirmation theory of expectations, the satisfaction was determined by the intensity and positive or negative directions of the gap between expectations and the performance perceived; the level of satisfaction was then determined by the gap between expectations and performance. Figure 6 shows the comparison between the expectations and the satisfactions expressed in the questionnaires applied to the students.



**Figure 6.** Comparison between the students' expectations and their satisfaction about the mathematics course in the *e* and *b-learning* modalities.  
Source: Self development.

As observed, to the exception of the affective category, the perception of their experience with the course covers their expectations almost completely.

## DISCUSSION

In many of the studies conducted in industrial and service environments, the categories of analysis correspond to the objects assessed (products or service), hence, their transfer to the educational environment could not be linear or mechanic, or construct categories of analysis of the educational reality to study only based on the participants' empirical experience; therefore, we decided to explore the use of the categories of the didactic suitability theory (Díaz, 2010) to study the participants' satisfaction about the course from the constructs of the disconfirmation theory of expectations (Oliver, 1981, quoted in Moliner, 2003, p. 13).

In the chapter of results, we notice that the articulation of categories and approaches to these two theories were adequate for the design of the instruments as well as for their subsequent analysis and determination of the students' satisfaction. This aspect, the exploration of the articulation of two theoretical approaches, is based on the absence of works that would respond to the requirements of our research; only at the end, did we have access to a paper (Zambrano, 2016) that proposes a model and categories of analysis about the satisfaction of the participants in *e-learning* courses for the higher level, close to the approach developed for this research.

We also found that some authors, to assess the students' satisfaction (Ros, Muñoz and Méndez, 1990; Valenzuela and Requena, 2006; Fernández *et al.*, 2007; Salinas and Martínez, 2007; De la Fuente *et al.*, 2010; Hernández *et al.*, 2010), used questionnaires as their main data collection instrument. In spite of all these studies on the area, "there is no clear tendency in regard to unifying an instrument as a way to measure the satisfaction of the university students" (Candelas, Gurruchaga, Mejías and Flores, 2013, p. 264), i.e, designing an instrument to assess the satisfaction and the results are subsequently analyzed by statistic means; however, there is no explanation of any theoretical starting approach to assess satisfaction or its definition of the categories of analysis that may be useful in academic settings and, more specifically, in *e* and *b-learning* modalities.

Therefore, in this research, we used the approach of the disconfirmation theory of expectations "to explain the satisfaction judgments, which was recognized as the most relevant theoretical support" (Moliner, 2003, p. 46); its adaptation and application to the educational field was useful to establish the nodal points of the analysis and to design instruments to assess the student experience with an educational service.

According to Gil, Sánchez, Berenguer and Martínez (2005) who point out that there are "few universal measures for service assessment, it is therefore necessary to develop instruments adapted to the specific

environment of the business being enquired” (p. 56), we then retook the dimensions of the didactic suitability theory and its categories to design the data collection instruments.

Given the qualitative nature of the work and the conditions in which the modalities of the course are developed, one of its main limitations is the presentation of the results of only one course, hence, the difficulty to make generalizations about the results and the recommendations made so far.

Based on the results, it will be necessary to redesign the questionnaires used; this redesign includes improving the relation between questions and categories, and the interrelation between the questions of the questionnaires on expectations and satisfaction. Moreover, it is essential to submit the two questionnaires to the statistical requirements of reliability and validity, in order to obtain more reliable results regardless of the course or the subjects to assess.

## CONCLUSIONS

In this paper, we presented the preliminary results of the research which purpose was to assess the satisfaction of the candidates to postgraduate studies of Electronic Engineering with propaedeutic course in advanced mathematics offered through *e* and *b-learning* modalities.

We consider that the disconfirmation theory has been a useful tool to guide this work of analysis of the design and operation of the course. Despite being a theory that came from the service environment, its application to the educational field is advantageous since it has helped establishing the nodal points to assess the experience of an educational service. On the other hand, the categories of didactic suitability, element of the theory of the didactics of mathematics, more specifically the onto-semiotic theory of the teaching of mathematics, allowed us to establish specific points when designing the course, its operation as well as provide us with elements so the candidates could express their expectation and satisfaction with the experience offered in the course designed in two educational modalities based on ICTs.

It is necessary to insist on the fact that the exploratory character of this research includes not only the relevance of the link between the categories of a theory of the didactics of mathematics and a theory of satisfaction emerged from the service environment, but that it extends the possibility to analyze at least three stages of the process: the design, the operation and the assessment.

Lastly, based on what has been expounded so far, we must point out the conclusions of this research:

- In spite of the technological limitations under which the course in *e* and *b-learning* operated, the students perceived their experience as satisfactory.
- The teacher's limitations in technological knowledge did not constitute an obstacle for the students to perceive their experience as satisfactory.
- The teacher's empirical knowledge emerging from his experience, allowed designing and operating a course that was close to the theoretical categories of didactic suitability.
- In order to improve the course in *e* and *b-learning* modalities, it is necessary to comply with all the categories proposed by the didactic suitability, more specifically with the aspects of interaction and affection. This implies that the teacher knows this theory and the characteristics that differentiate both modalities of face-to-face situations.
- The components of the didactic suitability as elements to study the expectations and satisfaction of the students are adequate for the analysis and design of courses in *e* and *b-learning* modalities.
- This type of studies provides higher education institutions with a tool to increase the quality of their educational services and the implementation of institutional policies about offering educational modalities other than the face-to-face modality.

Even though a more detailed analysis about expectations and satisfaction for each one of the modalities is necessary, the findings in the results section show how the expectations of the students were almost covered by the course offered. We need to analyze with greater detail the reasons why the affective category showed differences between the expectations and the satisfaction about the course.



- Díaz Godino, Juan; Batanero Bernabeu, Carmen & Font Moll, Vicente. (2007) The onto-semiotic approach to research in mathematics education. *The International Journal on Mathematics Education*, vol. 39, núm. 1 y 2, pp. 127-135. Recuperado de [http://www.ugr.es/~jgodino/funciones-semioticas/ontosemiotic\\_approach.pdf](http://www.ugr.es/~jgodino/funciones-semioticas/ontosemiotic_approach.pdf)
- Fernández Ricco, Esteban; Fernández Fernández, Samuel; Álvarez Suárez, Alberto y Martínez Cambolor, Pablo. (2007). Éxito académico y satisfacción de los estudiantes con la enseñanza universitaria. *Relieve, Revista Electrónica de Investigación*. vol. 13, núm. 2, pp. 203-214. Recuperado de <http://www.redalyc.org/pdf/916/91613204.pdf>
- Folgueiras Bertomeu, Pilar; Luna González, Esther y Puig Latorre, Gemma. (2013). Aprendizaje y servicio: estudio del grado de satisfacción de estudiantes universitarios. *Revista de Educación*, núm. 362, pp. 59-185. 10-4438/1988-592X-RE-2011-362-157
- García Sanchis, Margarita; Gil Saura, Irene y Berenguer Contri, Gloria. (2015). Dimensionalidad del servicio universitario: una aproximación desde un enfoque de marketing. *Revista Iberoamericana de Educación Superior*, vol. 6, núm. 15, pp. 26-49. Recuperado de <http://www.redalyc.org/articulo.oa?id=299133728002>
- Gil Saura, Irene; Sánchez Pérez, Manuel; Berenguer Contri, Gloria y González Gallarda, Martina. (2005). Encuentro de servicio, valor percibido y satisfacción del cliente en la relación entre empresas. *Cuadernos de Estudios Empresariales*, núm. 15, pp. 47-72.
- Hernández Gutiérrez, Carolina. (2017). *Valoración de la satisfacción de los estudiantes con el curso propedéutico de matemáticas en modalidades e y b-learning*. Reporte final del proyecto presentado en la Maestría en Electrónica. Departamento de Planeación, México: Cenidet.
- Hernández Velázquez, Claudia; Lara García, Baudelio; Ortega Medellín, Martha; Martínez González, María y Avelino Rubio, Ignacio. (2010). Evaluación de la satisfacción académica de los estudiantes de la licenciatura en Didáctica del Francés. *Revista de Educación y Desarrollo*, núm. 15, pp. 35-46. Recuperado de [http://www.cucs.udg.mx/revistas/edu\\_desarrollo/anteriores/15/015\\_Hernandez.pdf](http://www.cucs.udg.mx/revistas/edu_desarrollo/anteriores/15/015_Hernandez.pdf)
- Isac, Florian & Rusu, Sergiu. (2014). Theories of consumer satisfaction and the operationalization of the expectation disconfirmation paradigm. *Annals of the "Constantin Brâncuși" University of Târgu Jiu, Economy Series*, núm. 2, pp. 82-88. Recuperado de

[http://www.utgjiu.ro/revista/ec/pdf/2014-02/10\\_Isac,%20Rusu%201.pdf](http://www.utgjiu.ro/revista/ec/pdf/2014-02/10_Isac,%20Rusu%201.pdf)

- Kumbhar, Vijai. (2010). *An empirical study of alternative banking and its impact on customers' satisfaction: A case study of public and private sector banks in Satara city*. (Tesis de doctorado.) Facultad de Ciencias Sociales, Shivaji University, Kolhapur, India.
- Llarena, Miriam y Paparo, Mauro. (2006). Propuesta de una metodología de seguimiento y evaluación de cursos a distancia. *RIED: Revista Iberoamericana de Educación a Distancia*, núm. 4, vol. 37.
- Moliner Velázquez, Beatriz. (2003). *La formación de la satisfacción/insatisfacción del consumidor y del comportamiento de queja: aplicación al ámbito de los restaurantes*. (Tesis de doctorado.) Universidad de Valencia, España.
- Paechter, Manuela; Maier, Brigitte & Macher, Daniel. (2010). Students' expectations of and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers & Education*, vol. 54, núm. 1, pp. 222-229. <https://doi.org/10.1016/j.compedu.2009.08.005>
- Quality Matters. (2014). *Standards from the QM Higher Education Rubric* (5ª ed.). Quality Matters. Recuperado de <https://www.qualitymatters.org/sites/default/files/PDFs/StandardsfromtheQMHigherEducationRubric.pdf>
- Ros García, María; Muñoz-Repiso Izaguirre, Mercedes y Méndez Miras, Ana. (1990). ¿Qué ocurre en las aulas?: estilo docente de los profesores y satisfacción de los alumnos de enseñanza secundaria. *Revista de Educación*, núm. 291, pp. 319-338. Recuperado de <https://www.mecd.gob.es/dctm/revista-de-educacion/articulosre291/re2911600477.pdf?documentId=0901e72b81376b2f>
- Salinas Gutiérrez, Agapito y Martínez Camblor, Pablo. (2007). Principales factores de satisfacción entre los estudiantes universitarios. La Unidad Académica Multidisciplinaria de Agronomía y Ciencias de la UAT. *Revista Internacional de Ciencias Sociales y Humanidades, SOCIOTAM*, núm. 17, pp. 163-192. Recuperado de <http://www.redalyc.org/articulo.oa?id=65417108>
- Valenzuela Rettig, Ana y Requena Magallanes, Carlos. (2006). *Grado de satisfacción que perciben los estudiantes de pregrado de la Facultad de Ciencias Económicas y Administrativas de la Universidad Austral de Chile, respecto a los métodos de enseñanza y aprendizaje utilizados, evaluaciones, organización de carreras equipo docente e infraestructura de dicha facultad*. (Tesina para el

grado de licenciado en Administración.) Universidad Austral de Chile.

Zambrano Ramírez, Jimmy. (2016). Factores predictores de la satisfacción de estudiantes de cursos virtuales. *RIED. Revista Iberoamericana de Educación a Distancia*, vol. 19, núm. 2, pp. 217-235. <http://dx.doi.org/10.5944/ried.19.2.15112>

