Hamut'ay
Biannual Scientific Journal
Coordination of research and extension scientific-technological (CIECT-DUED).
University Direction of Distance Education-ALAS PERUANAS UNIVERSITY
http://revistas.uap.edu.pe/ojs/index.php/HAMUT/index
ISSN: 2313-7878 DOI: 10.21503/hamu.v5i2.1619 Vol. 5(2). July-december. Hamut'ay 2018. Lima-Peru

Active participation and evaluation of the didactic materials in success / failure academic in Distance Education

Participación activa y valoración de los materiales didácticos en el éxito/fracaso académico en educación a distancia

Segundo Agustín García Flores[1]
https://orcid.org/0000-0001-8587-3211
Universidad Alas Peruanas, Perú

Received: 07-01-2018
Accepted: 11-19-2018

Citation

García, S. (2018) Participación activa y valoración de los materiales didácticos en el éxito/fracaso académico en educación a distancia. [Active participation and evaluation of the didactic materials in success / failure academic in Distance Education] Hamut´ay, 5 (2), 32-45. http://dx.doi.org/10.21503/hamu.v5i2.1619

Abstract

Quality professional training at the level a distance program demands having a report on the influence of active participation and the students' perception of the didactic materials on the academic success / failure of students at Alas Peruanas University. Therefore, the objective was to analyze such influence in the final grades of a subject, while the hypothesis was that these variables positively influence the academic success / failure. This is a basic correlational research with a non-experimental, cross-sectional design. The method is hypothetic-deductive. The sample consisted of 153 students of the 2016-II semester. The logistic model applied in the hypothesis testing has the capacity to correctly classify 68,6% of the analyzed cases. Cut-off value 0,5. The Hosmer and Lemeshow test for the model has a chi square = 0,159, gl = 1 and p-value of 0,690. For $\alpha = 0,05$, it is evident that the model has a good data adjustment. The obtained results confirm a significant influence on the final grades of the subject in terms of the active participation variable, with CI for Exp (B) from 1,460 to 32,962; as well as the positive perception of the digital material available on the Blackboard platform and the printed materials received, with CI for Exp (B) from 1,772 to 82,55.

Keywords: Active participation, assessment of didactics materials, academic performance, distance education.

Resumen

La formación profesional de calidad en el nivel de educación a distancia requiere tener un reporte de la influencia de la Participación Activa y la Valoración de los materiales didácticos en el éxito/fracaso

1 Bachelor of Mathematics. Master in University Teaching and Educational Management. Teacher of the University Directorate of Distance Education at Alas Peruanas University. Email: sgflores13@yahoo.es

académico de los estudiantes de la Universidad Alas Peruanas. Por ello, el objetivo fue analizar dicha influencia en las calificaciones finales de asignatura, siendo la Hipótesis que dichas variables influyen positivamente en el éxito/fracaso académico. La investigación es de tipo básica, de nivel correlacional. El diseño es no experimental, transversal. El método es hipotético-deductivo. La muestra estuvo compuesta por 153 estudiantes del semestre 2016-II. El modelo logístico aplicado en el contraste de hipótesis tiene una capacidad de clasificar correctamente al 68,6% de los casos analizados. Valor de corte 0,5. La prueba de Hosmer y Lemeshow para el modelo tiene chicuadrado = 0,159, gl = 1 y p-valor de 0,690. Para $\alpha = 0,05$, se evidencia que el modelo tiene un buen ajuste de datos. Los resultados obtenidos corroboran una influencia significativa en las calificaciones finales de asignatura por parte de las variables participación activa, con IC para Exp(B) de 1,460 a 32,962; así como de la valoración positiva del material digital disponible en la plataforma Blackboard y los materiales impresos recibidos, con IC para Exp(B) de 1,772 a 82,55.

Palabras Clave: Participación activa, valoración de material didáctico, Rendimiento académico, Educación a distancia.

Introduction

In education, the measurement of learning is a key element for the quality of the education service. (Zambrano, 2016). In this regard, there are studies on measurement of learning outcomes and their associated factors, as referred to by Arribas, 2014; Vergel-Ortega, Martinez-Lozano & Zafra-Tristancho, 2016. Expectations, skills and performance of students in distance education were studied by Herrador & Hernández, (2013); Ramos, Rodrigues, Gomes & Silva, (2014); Aucandela & Eugenia, (2016). On the other hand, Gomez (2016) studied the essential actions that must be deployed to learn and the experiences of students with the technological platforms and their relationship with academic achievement in the first year of study in university systems of virtual education.

For Davila, Garcia-Artiles, Perez-Sanchez & Gómez-Déniz (2015), the positive assessment of available material that the student may have is one of the variables, which could determine academic performance. For this, they used an asymmetric logistic regression model to explain that the probability of passing a course increases if the student believes that the available material is adequate for supplementing the subject. However, these studies did not address, for example, the student's participation in tutoring or in a virtual classroom.

On the other hand, low attendance at tutoring sessions, a small number of queries, and little participation in the forums and blog have been observed in the teaching practice of administration and international business students in Distance Education (DE) and the operative subject Investigation. However, the students do watch the telematics tutoring videos. They also print supports and carry their text.

On the other hand, they have low grades in exams. This allows the presumption that the academic success or failure in (DE) could be related to the interaction that students develop with their tutor and teaching materials. This is why the situation to improve administration and International Business (AIN) in the Dirección Universitaria de Educación a Distancia (DUED) at Universidad de Alas Peruanas (UAP) consists in the lack of reports about how the participation of the students in tutoring or the virtual classroom relate and enable satisfactory academic performance (AP), in particular on the subject of Operative Investigation. Also, are the lack of relevant information in relation to the assessment of the teaching materials from the student, and the current state of these materials (both printed and

digital), adequate for their autonomous learning? Is the student's interaction with the text sufficient to develop their academic work with support of readings available in in virtual classroom? These aspects are considered important in academic performance in DE.

Thus, the following problem arose: How does active participation and assessment of the teaching materials influence the academic performance of students of the subject of Operative Investigation (OI) in the major of Administration and International Business in the distance education mode in the Universidad Alas Peruanas?

The objective is to determine the influence that active participation and assessment of teaching materials had on academic performance in distance education mode, the hypothesis being: Active participation and assessment of teaching materials have a positive influence on the academic performance of the students of Operative Investigation, in the major of Administration and International Business in the mode of distance education in the Universidad Alas Peruanas.

Active participation in tutoring

Active participation as a process develops within the framework of a set of activities, which constitute an academic work. The participation level of a student depends on their characteristics and motivation to learn. Therefore, to support the learning process in DE the teacher-tutors have an important role (Fernandez-Jimenez, Mena-Rodriguez & Tovar - Hurtado, 2017), since they assume the responsibility of planning and designing learning activities that generate active participation of the students, through the development of works to be discussed in groups, group work, participation in face-to-face sessions, etc., in the context of student-centered learning.

The tutor must control the content of the subject and evaluation strategies; necessary technological skills and sufficient respect to the virtual environment develop their role. In addition, they must be counselor and guide in order to avoid the isolation and loneliness of the student in this mode so that it promotes self-regulated learning. (Fernandez-Jimenez et al. 2017, Garcia-Barrera 2016, p.4).

Tutors promote a collaborative environment and have the ability to motivate and educate the student. In addition, permanent interaction between tutor and student motivation powers the learning process, even more if in practice the tutor makes evident their accompaniment and monitoring of the activities of the subject, through the resources of the Virtual Classroom. (Mora & Bejarano, 2016).

Thus, to efficiently perform their role, the tutor must undergo a training process in the theoretical foundations of distance education. In this way, the skillset and teaching competencies are put into practice in the didactic, technical and psych affective domains during virtual or face-to-face tutoring, allowing students to identify additional information required for a complete understanding of the contents and good development of the academic work (Ruiz & Davila 2016).

On the other hand, the tutor provides pedagogical support to complete unclear areas in the development of content. Therefore, aspects that should be considered are conceptual, procedural, attitudinal, and values aspects that allow the knowledge to be delved into, using deductive and inductive reasoning that helps them to solve problems, make decisions, be critical, and be creative. That is to say, the pedagogical practices of the tutor complemented by the use of the technological competencies are an important component that will help the student's achievement in learning, as agreed upon by Ruiz & Dávila (2016).

In addition, the tutorial action is a relevant strategy (teaching, guiding and training) to help allow the student adapt to University life (Sánchez & Rosales, 2016); and, consequently, to work on their professional project. That is to say, it is an element that helps to avoid University failure and/or desertion, which is high in DE, according to Fernandez-Jimenez et al. (2017).

The tutorial dynamics generates spaces not only for collaboration, but also encourages social relations where students show their affections, emotions, expose common problems in the academic

and personal life, and support each other by searching for solutions which makes them involved protagonists of their learning.

The experience of student in the DE is distinctive according to advances in their formative process. That is to say, at first it was perceived that tutoring and interaction are for support, coexistence, and companionship; while the latest perception is that communication and mentoring is a medium, and they report negative aspects such as absence and authority, among others (Sanchez & Rosales, 2016).

In that line, we understand that in DE, participation in tutoring occurs when students pose questions about the subject to be discussed, exchange information between them, or engage with issues of common interest in the tutorial telematics or face-to-face session.

Active participation in virtual classroom

DE has led to teachers being obligated to use and apply as educational resources all the technological tools that are available on the platform that is part of the virtual classroom, with the purpose of making the offer to students to actively participate in all of their professional training, so these tools will be described in detail.

Blackboard Collaborate provides Virtual Classroom (VC), understood as the space where contents and activities are customized, student progress is tracked, and the tutor adapts tutorial sessions to different levels of learning; that is to say, an environment similar to conventional forms of communication can be created. The VC has advantages and disadvantages (Aguilar, 2014). It also stands out because it incorporates the key informational, educational, experiential, and communicative dimensions of the teaching-learning processes (Flores, 2012, p.122 cited by Aguilar 2014).

Thus, In Blackboard Collaborate the communicative interaction between students and teachers from DE occurs through the technological resources that are had during a web conference. Through this, real-time communication through audio, video, and data between the parties can be done from anywhere, in addition to alerts to ask for participation in the virtual classroom, interactive digital whiteboard, and a stopwatch tool for quizzes. In addition, in the Chat as a form of synchronized written communication between the tutor and the student or students, allowing them to exchange opinions, ask questions, and discuss concepts. This creates interaction between the participants, which enhances the importance of communicative interaction that occurs in the teaching-learning process in virtual environments (Montenegro, 2016).

The Blog. Tool of open communication where graphics, audiovisual, or multimedia resources on any topic in particular can be inserted. Larreal (2015) discusses various definitions of this asynchronous tool. The aim is that students share their opinions and argue points of view on a hub topic. That is to say, it is an element of learning support not only for the videos that are published (usually YouTube) but rather contributes to the development of digital skills and greater effectiveness in the work of tutoring, according to Rodriguez & Fernandez (2017), basically it is a space to promote the active participation of the students and the interaction with the tutor and fellow students, promoting the achievement of the proposed objectives and especially the construction of knowledge on a subject (Jenaro-Rio, Castano-Calle, Martin-pastor & flowers-Robaina, 2018; Ruiz & Davila 2016). Finally, the blog/ "has a positive impact on learning supporting constructivist educational activities in a manner which is cognitive and socially interactive." (Chavez, Del Toro & Lopez, 2017, p.48).

The Forum. It is defined as a shared, virtual or physical space, in which several people meet to exchange and gather ideas and experiences on one or several subjects (Chavez, Del Toro & Lopez, 2017, p.49). In addition, which has the purpose of maintaining an asynchronous or deferred participation time around a common and specific theme in common or any topical theme geared to contribute to the objectives of the profile of the graduate in a professional career. The minimum condition to open the forum is participation (production and reproduction).

The types of Forums used in DE: Welcoming, which allows the personal presentation of the tutor and invites the student to express their expectations on the subject, of whose purpose is to resolve specific issues of content and discussion focused on the discussion of a hub topic. That is to say, when the teacher-tutor plans forums, they take into account aspects to the resolution of problems, to the contrast of ideas to the collective thinking, to disseminate and communicate ideas of interest of the group.

Among the benefits of the discussion forums are: increase student participation and the development of critical thinking in higher education according to Kutugata (2016). Being so, tutors properly choose the subject to discuss, guide, give feedback, and filter negative responses that threaten the climate of learning; they stimulate the cohesion of the group (Carrasco, Carrillo, Bazley, Vergara & Contreras, 2017); and they encourage reflective, collaborative participation favoring interaction between participants (From Lucas-Santos, 2017). The main concern is to know how knowledge is constructed through the discussion, i.e., what are the social and educational factors in the process of learning in online forums. (Torres-Gordillo & Perera-Rodriguez, 2015).

To promote interaction, the teacher must plan and structure the forums of discussion with instructional activities, projects, or reports that contribute to collaborative learning according to the objectives and competences of the subject, Kutugata (2016). Therefore, active participation in forums implies that the student analyzes and expresses his point of view or proposes topics of discussion.

Active participation in virtual classroom is understood as that of the person (teacher or student) who watches the video of the conference room, access the forum, opens or reads a message and sends a reply or a new one at the minimum. Otherwise, it is important to plan activities that encourage such participation.

Assessment of the teaching materials

In DE, the teacher adapts their teaching strategies based on new technologies that provide platforms like Blackboard Collaborate. Therefore, in the case of DUED-UAP, they combine the uses of two types of materials: Digital (new technologies) and print (conventional) according to Aguilar, Ayala, Lugo & Zarco (2014). These materials help self-learning without support of a tutor, to be used autonomously with the support of the tutor and auxiliary or supplementation of other materials, facilitating their learning to develop skills and the formation of attitudes and values (Barcelo & Ruano, 2014).

Likewise, teaching material attends to different styles of learning through positive redundancy including videos, web readings, and links, among others. In other words, for the message to be understood, different channels are used to present the information in a different way (Poveda, 2016).

Thus, when the teacher-tutor selects the digital resources, they must ensure their relevance and that they meet minimum quality requirements. This implicates their contribution to the quality teaching-learning processes (Garcia-Barrera, 2016).

Regarding the printed material, it presents some weaknesses as, for example, it cannot help students understand the content by itself, it is difficult to promote feedback to questions; however, it has the advantage of being self-sufficient, easily accessible, and portable. As for the tutorial, this contributes by motivating, guiding, and facilitating the student's approach to knowledge and to interaction with the tutor.

In DE, digital materials are available, such as aids, web graphics, readings, other multimedia formats, etc., that support learning, to create copies of documents, texts, (properly referenced) articles that are not necessarily easily accessed by students or information that is scarce. In addition, as support for the study to transmit and share examples, applications or casuistry that arises in each subject. Finally, the student uses and leverages them in order to complement and reinforce the themes of the teaching units. According to Trangay & Ruiz de la Torre (2018), teaching material enables "that students have the opportunity to develop their capacity for analysis and reflection,

and that, supported educational platforms, promote their active participation in discussion spaces and debate" (p.102). This highlights the important work of teaching tutors in the selection and conduction of digital materials. They design, operationalize, and develop educational strategies based on the use of digital materials, as well as assessing learning. Teaching tutors are supported in the use of these materials as a means to promote interactivity and creativity (Gallardo et al., 2017). Digital materials and available web graphics must stay active in a given period.

On the other hand, in the context of distance education, the appreciation of materials by students has to do with the satisfaction or lack thereof of their real learning needs on a subject. That is to say, if the utility and support that should be given to the materials matches their learning objectives, the student is involved in the proposed activities and their autonomous learning.

Thus, the value that students give to the material might be affected by the ease or difficulty as an element of support in their academic work; as well as wanting to look good with the institution. For this reason, it is important to know the factors predictive of the satisfaction of students according to Zambrano (2016).

For Garita-Gonzalez, Gutierrez-Duran & Godoy-Sandoval (2018), "… should evaluate the importance that the written material continues having in this technological age, and as new emerging technologies provide more usability and motivation" (p.144).

The direct experience the student has with the materials, compliance or lack thereof of previous expectations, offered by the institution, as opposed to the real role played in their self-learning, and how it is reflected in their grades is vital in their assessment. They could therefore be satisfied and assess in a positive way or feel dissatisfied and issue a negative assessment to relate the difficulties and shortcomings in the teaching materials with the fact that it interfered with the construction of their knowledge and their learning (Garita-Gonzalez, et al., 2018, p.145).

As a result, this assessment helps to detect difficulties in material that the institution must amend in a subsequent edition.

Academic performance (AP) in distance education

It is understood that learning happens from the outside in, through interaction with others in a dynamic of appropriation of the culture, but above all in relation with the environment and the support from others. Learning is a process of knowledge construction from intersubjective activity (mutual social interactions) and subjective restructuring (as a process of internalization) (Pomajambo, 2015, p.9).

Thus, in the context of distance education, students strive to develop general and specific skills needed to successfully conclude university studies and for his later professional career. However, the effort does not only guarantee success, but also skills such as teamwork, problem solving, effective communication, data analysis, order, ethics, self-esteem, and skills and attitudes that are forever more demanded by the labor market (Garita-Gonzalez, et al., 2018). For this reason, an indicator approaches the knowledge of the results of the performance and level of learning in students: academic performance (AP).

AP as construct entails a limitation because it responds to the educational model of each university and in general to the university system. Therefore, the assessment of AP depends on these aspects mentioned.

This research considers the final grades as a criterion of AP, linking summative evaluation and certification of the evaluation. Of interest is the immediate performance related to success or failure, in one academic period and in a subject. Immediate performance refers to skills that the student achieves their academic and/or tests that allows them to pass a subject, remain in the subject, or fail to enroll (Abarca, Gomez & Venegas, 2015).

In DUED-UAP, AP is understood as a result of the curricular learning content in conceptual, procedural aspects and attitude, expressed in subject scores. Thus, final qualification is obtained with the qualification of two exams: a partial and

a final. Each test has a weight of 30%; and qualification of the academic work has a weight of 40%. The measuring scale is from 0 to 20. Thus, the grades obtained represent more than just performance on tests, they are also evidence of achievements within educational experiences and in a context that is mediated by technology (Vergel-Ortega et al., 2016).

Materials and Methods

Participants

The population is 1040 students enrolled in the major of Administrative and International Business in DUED-UAP in the 2016-II semester. The calculation of the sample size was:

$$n = \frac{Z^2 p \bullet q \bullet N}{E^2 (N-1) + Z^2 p \bullet q}$$

Where: N = population size, p = probability of success or completion, q = probability of mistakes or failure, E = level of precision = 0.05 and Z = 1.96 (95% confidence level)

Inclusion criteria: students of Administration and International Business at DUED-UAP, who enrolled in operative investigation and stay until the end of the course.

Exclusion criteria: students who do not attend the survey application or who do not adequately fill the survey.

Initial sample: 281 students, 153 after applying the exclusion criteria (45% men and 55% women). These students already exceeded half of the time spent in the major in DUED-UAP and their ages are on average 33 years for men and 30 years for women.

Instruments

The instruments used were three for data collection: the first, a (01) questionnaire of performance of the student tutoring and virtual classroom in the LMS (Blackboard Collaborate), composed of six (06) dichotomous pre-coded closed questions.

In tables 1 and 2, the description of the items is shown by each dimension of active participation.

Table 1
Description of the items by dimension active participation in tutoring.

Dimension: Active participation in tutoring	
1. In the weekly tutoring, according to you, what is your performance or that of your classmates?	a) I have communicated actively since the beginning of the tutoring. b) My colleagues pay attention to the tutor. c) I ask questions to clarify the topic or to motivate reflection. d) I participate in the activities proposed by the tutor, involving myself with them, contributing my ideas and opinions and seeking to carry them out in the best possible way. e) My companions provide a pleasant climate (tolerance, respect and good treatment). f) I have attended prepared for the tutoring; that is, having reviewed the topics. g) I contribute to the tutoring with additional material and information.

Table 2
Description of the items by dimension active participation in the virtual classroom

Dimension: Active participation in the virtual classroom	
2. Through the virtual classroom, you usually, often participate in:	Visualize the weekly video of the Conference Room? If your answer is Yes ? Indicate: • How many times do you see a video of the Conference Room? • How many scheduled videos have you visualized?
3. Through the virtual classroom, you usually, often participate in:	Blog? If your answer is Yes ? go to the next question.
4. During your stay on the blog:	a) Do you analyze the entries published by the tutor, to explore contributions and contributions for your learning? b) Do you leave your comments on the publication? c) Do you review any video that the tutor recommends for your learning?
5. Through the virtual classroom, you tend to, often participate in:	Forum of the course? If your answer is Yes ? go to the next question.
6. During your stay in the forum:	a) Do you analyze the debates in the forum, to explore contributions and contributions for your learning? b) Express your point of view on the subject? c) Do you propose discussion topics that contribute to answering questions or giving feedback on the issues?

The second, a (01) questionnaire for the evaluation of the student with the digital teaching materials such as printed, consisting of five (05) questions: 02 dichotomous and 03 with a rating of (1) Excellent, (2) Good, (3) Average and (4) Not suitable. Tables 3 and 4 show the description of the items for each dimension of the evaluation of teaching materials.

Table 3
Description of the items by dimension estimation of digital teaching materials

Dimension: assessment of digital teaching material	
1. For the development of your academic work, you tend to often resort to	a) Consult with your tutor? b) Virtual library? c) Didactics help? d) Exchange of information with your classmates?
2. During your weekly study hours, you usually, often resort to:	a) Didactic help for a better understanding of the information? b) Visit the webgraphic; that is, the electronic addresses reference? c) Readings to strengthen your knowledge?

Table 4
Description of the items by dimension estimation of printed teaching materials

Dimension: evaluation of printed didactic material	
3. Do you consider that the text book and its didactic guide is an element that:	a) Does it contain current issues that were considered in the exams? b) Does it show the prerequisites that are relevant to your learning? c) Does its design allow you to handle it easily and take it everywhere you do your activities? d) Does it present different examples and situations that help to understand the contents? e) Does it facilitate the construction of knowledge? f) What motivates you to continue in the Professional career?
4. Do you consider the text book and its didactic guide to facilitate:	a) Self-learning without the support of a Tutor? b) Do I study autonomously with the support of a Tutor? c) Relate the Material with other complementary materials? d) Self-evaluation activities that help you in your learning and prepare you for the exams?
5. What is your general assessment of the teaching material?	a) Suitable for your learning b) It is motivating and self-instructive c) Facilitates communication with colleagues d) It is updated e) Its wording is clear

The third one (01) notes with 153 final grades of operative research record in the 2016-II semester.

On the other hand, the relationship between item and the dimensions of each predictor variable are shown in table 5.

Table 5
Dimensions, indicators and instrument items

Dimensions	Indicators	Items
Active participation in Tutoring	Level of interaction in tutoring	1. a), b), c), d), e), f), g)
Active participation in the virtual classroom	Level of interaction in the virtual classroom	2, 3, 4, 5 6. a), b), c)
Assessment of digital teaching materials	Degree of assessment	1. a), b), c), d) 2. a), b), c)
Evaluation of printed teaching material	Degree of assessment	3. a), b), c), d), e), f) 4. a), b), c), d) 5. a), b), c), d), e)

Questionnaires were subjected to expert opinions and the quantification of the AIKEN V validity coefficient is 0.92 (See table 6). In addition, the Cronbach's alpha of whose total value is considered good 0.810 was used to verify the reliability of the questionnaire.

The instruments were implemented physically, at a national level, during the 2016-II semester. Each student responds to the instrument, following the directions on the questionnaire.

Type and Design

This research is basic, since "it seeks production of theoretical knowledge. It focuses on the generation of models of reality in order to explain it and to predict it . . ." (Fontainez, 2012, p.126). The level is correlational predictive, according to Hernandez, Fernandez & Baptista (2014) "Associated variables using a predictable pattern for a group or population" (p.93). The method is hypothetical deductive. The design is not cross experimental, since they are "Studies that are carried out without the deliberate manipulation of variables and on those who only observed phenomena in their natural environment for analysis". Cross because data are collected in a single moment, in a unique time, Hernández et al., (2014, p.153-154)

Table 6
Validity of AIKEN V coefficient

N°	Indicators	Qualitative / quantitative criteria	Judges				Item Value	Average	V de Aiken
			1	2	3	4			
1	Clarity	It is formulated with appropriate language	90	80	90	60			
2	Objetivity	It is expressed in observable behaviors	100	90	95	80	365	91,25	0,92
3	Present	Appropriate science and technology	95	95	95	95	380	95,00	0,96
4	Organization	There is a logical organization	100	90	95	80	365	91,25	0,92
5	Sufficiency	It includes aspects of quantity and quality	90	100	90	100	380	95,00	0,96
6	Intentionality	Suitable to assess aspects of the study	90	90	95	60	335	83,75	0,85
7	Consistency	Based on theoretical-scientific aspects and the subject of study	95	90	90	70	345	86,25	0,87
8	Coherence	Among the indices, indicators, dimensions and variables	100	100	95	100	395	98,75	1,00
9	Methodology	The strategy responds to the purpose of the study	90	100	100	100	390	97,50	0,98
10	Convenience	It generates new guidelines in the research and construction of theories	95	90	90	80	355	88,75	0,90
	Subtotal		946	927	938	829	3640		9,17
	Average		94,60	92,70	93,80	82,90			0,92

Procedure

This research was developed in two phases:

First. Initially, a group of students of management and international business was gradually observed in communicative interaction during telematic tutoring sessions of operational research. This allowed the formation of the theoretical framework of research. Then, permission and support were requested from DUED-UAP for the implementation of the instruments. With the permission of the fieldwork, surveys were applied to the sample in a single moment, at the end of the academic term 2016-II.

Second. The survey was debugged, encoded, and the data obtained was processed. Contingency tables were made. The binomial logistic regression test was used to test the hypothesis given that the variable of interest follows a Bernoulli distribution. The SPSS software was used v.22.

Confidentiality or informed consent

The research development was authorized and supported by DUED-UAP for the implementation of the instruments. The objectives of the study were explained to the students, and the teacher was in charge of the teaching operative investigation, the questionnaire and the types of answers were explained, it was explained that the survey was anonymous and a volunteer-basis, and that if they took the questionnaire, they were giving consent for the data to be analyzed.

Results

The sample mean is 10.94 score slightly below the passing minimum which is eleven (11), possibly because the average is affected by extreme values. However, the median is twelve (12).

The quantitative variable academic achievement was aimed at success, if the final grade is between 12 and 20, and failure, if the final score is between 0 and 11. Therefore, follow the median ratings of end-of-course as a reference item to dichotomize. Therefore, academic performance is a Bernoulli distribution with parameter p>0.

Thus, 51 women passed the course with a final average greater than or equal to 12 as opposed to 33 of them who obtained a lower average. Simi-

larly, 37 men passed the course with an average finish greater than or equal to 12 against 32 of them who obtained a lower average.

Table 7
Final average for active participation

		Active participation		Total
		No	Yes	
PROMF_MED	PROMF < 12	63	2	65
		46,3%	11,8%	42,5%
	PROMF >= 12	73	15	88
		53,7%	88,2%	57,5%
Total		136	17	153
		100,0%	100,0%	100,0%

In the contingency table (Table 7) 42.5% of the students obtained a final average of less than 12. This percentage is higher, 46.3%, among those who did not participate actively while at 11.8% among those who participated. Likewise, 57.5% of the students obtained a final average equal to or greater than 12, the greater percentage, 88.2%, of who participated actively as opposed to the 53.7% of those who did not participate.

Chi squared testing was applied for variables in table 7, where the value of the statistic of the contrast (bilateral) obtained was 7.386. The p-value is 0.007. It can be seen that, at a significance level of 0.05, active participation exerts influence on academic performance.

Factorial analysis was applied to the items of the questionnaire for the evaluation of printed material. The maximum likelihood method was used for the extraction of factors by prefixing them in four (04) that account for 69% of the total variance. The KMO test (Kaiser, Meyer & Olkin) test is 0.885 > 0.8 for which the model is notable. Bartlett's sphericity chi squared test scored 1225.656 with gl = 105 and p-value = 0.000 for which the model of factor analysis is adequate. The matrix of the solicited rotated factor applied to factors and the data was ordered from greatest to least where values of less than 0.60 absolute value were discarded.

Table 8
Final average valuation of teaching material

		VALOR_MDTG		Total
		VNEG	VPOS	
PROMF_MED	PROMF < 12	28	37	65
		65,1%	33,6%	42,5%
	PROMF >= 12	15	73	88
		34,9%	66,4%	57,5%
Total		43	110	153
		100,0%	100,0%	100,0%

In the contingency table (Table 8), 65.1% of the students who negatively valued the didactic materials obtained a final average lower than 12. This percentage is 33.6% lower than the percentage of those who positively valued said materials. Likewise, 66.4% of those who positively valued materials obtained a final average equal to or greater than 12, with the lowest percentage being 34.9% of those who gave a negative rating having a final average of less than 12.2.

Contrast of hypotheses. The estimate of the logistic regression model was performed with SPSS software. In table 9, the explanatory variables "PART_ACT" active participation and evaluation of teaching material "VAL_MDTG" are significant at 5%.

Table 9
Active participation and evaluation of teaching materials in the logistic model

	B	Standard Error	Wald	gl	Sig.	Exp(B)	95% C.I. to EXP(B Up	Down
PART_ACT(1)							1,460	32,962
VAL_MDTG(1)	1,341	0,393	11,672	1	0,001	3,824	1,772	8,255
Constant	-0,813	0,339	5,758	1	0,016	0,443		

The equation of the logistic model is as:

$$Ln\left(\frac{p}{1-p}\right) = -0{,}813 + 1{,}937 * PART\_ACT + 1{,}341 * VAL\_MDTG$$

Table 9 shows the confidence intervals of Exp (B), with greater than 1 limits, so we are confident that effectively the positive coefficients of the variables "PART_ACT" and "VAL_MDTG" increase the likelihood that a student finally

achieved an average greater than 12. Being so, it is observed that: a) Because of the marginal increase in the variable "PART_ACT", the rate of advantages of getting a satisfactory AP for a student who participates in tutoring or interacting in a virtual classroom contrasted with another who does not, increases by more than 5.93 times; and (b) By the marginal increase in the variable "VAL_MDTG", the rate of advantages of achieving a satisfactory AP for a student who appreciates the teaching materials, both digital and printed, contrasted with a student who does not value them, increases on average more than 2.82 times. The model has the capacity of correctly classifying 68.6% of the analyzed cases, see the table 10. The cutoff value is 0.5.

Table 10
Classification table for the variables in the table 9

Observed		Predicted		
		PROMF_MED		% Correcction
		PROMF< 12	PROMF>= 12	
PROMF_MED	PROMF < 12	28	37	43,1
	PROMF >= 12	11	77	87,5
			Percentage Overall	68,6

Table 10 shows that the sensitivity (S) is 87.5% and specificity (E) is 43.1%. The Hosmer and Lemeshow test for the model has chi squared value = 0.159, gl = 1 and p-value of 0.690. For α = 0.05, there is no statistical evidence that the model does not conform to the data. Therefore, we assume that the model has a good fit.

Table 11
Active participation in tutoring and virtual classroom in the linear model

Model	Non standarized coefficients		standarized coefficients		
	B	standar Error	Beta	t	Sig.
(Constant)	-0,160	0,030		-5,350	0,000
PART_ AVIRTUAL	0,514	0,041	0,694	12,606	0,000
PART TUTOR	0,250	0,035	0,389	7,070	0,000

Active Participation "PART_ACT," has as good predicted variables regarding mentoring "PART TUTOR" and active participation in the virtual classroom "AVIRTUAL PART". This is confirmed by a multiple linear regression.

The equation of the linear model is as follows:

$$PART\_ACT = -0{,}160 + 0{,}250 * Part\ Tutor + 0{,}514 * Part\ AVirtual$$

In table 11, the participation in the virtual classroom has greater impact on the variable for active participation than participation in tutoring. R2 = 0.555; that is to say, 55.5% of the total variance of the values of the active participation in the sample is explained by the regression. Variance Analysis and hypothesis Test of the adequacy of the model are shown in table 12, where we accept that at least one of the two predictive variables contributes significantly to active participation.

Table 12
ANOVA for the coefficients of the variables in table 7

Model	Sum of squares	*df*	Mean square	F	Sig.
Regresion	8,382	2	4,191	93,411	0,000b
Residual	6,730	150	0,045		
Total	15,111	152			

The assessment of the teaching material "VALOR_MDTG," has a Valuation of the digital material "VALOR_MDIGITAL" and valuation of the text and guide "VALOR_TEXTOGUIA" as good predictors.

Table 13
Evaluation of text and guide and digital material in the linear model

Model	Non standardized coefficients		Standardized coefficients		
	B	Standar error	Beta	t	Sig.
(Constant)	1,217	0,034		36,168	0,000
VALOR_MDIGITAL	0,567	0,040	0,629	14,003	0,000
VALOR_TEXTOGUIA	0,462	0,041	0,510	11,348	0,000

The equation of the linear model is as follows:

$$VALOR\_MDTG = 1{,}217 + 0{,}567 * VALOR\_MDIG + 0{,}462 * VALOR\_TEXTOGUIA$$

From table 13, it can be deduced that the assessment of the digital material has greater impact in the variable for evaluation of teaching material

than for the assessment of the text and teaching guide. R2 = 0.699; That is to say, 69.9% of the total variance of the values in the evaluation of teaching material in the sample is explained by the regression. The variance analysis and test of hypothesis of the adequacy of the model gives us the information:

Table 14
Analysis of variance for the model of table 9

Model	Sum of squares	*df*	Mean square	F	Sig.
Regresion	21,596	2	10,798	173,812	0,000b
Residual	9,319	150	0,062		
Total	30,915	152			

From Table 14, it is accepted that at least one of the two predictor variables contributes significantly to the assessment of the didactic material.

Discussion and Conclusions

In this research, the application of logistic regression gives us a model for academic achievement with the predictive variables: "PART_ACT" active participation with Wald index = 5.932 and p = 0.015; as well as assessment of teaching material "VALOR_MDTG" with Wald = 11.672 index and p = 0.001. The model has a capacity of correctly classifying 68.6% of the analyzed cases, with cut-off point 0.50. Likewise, the percentage of students correctly classified as passing with greater than or equal to 12 average is 87.5% while the percentage of students correctly classified who have an average of less than 12 is 43.1%. Therefore, it is concluded that the model best predicts whether a student will pass with greater than or equal to 12 than average than to predict whether a student will have one average of less than 12.

The results obtained show that employment of active teaching and learning strategies is associated with better academic results coinciding with Herrador & Hernández (2013); Jenaro-Río et al. (2018).

It is confirmed that the assessment of learning materials, positively influences academic performance of students in DE. It is confirmed that a student who interacts in the tutorial, communicates and exchanges information with his companions; as well as downloads their virtual classroom materials, reviews the forum and blog, and whose assessment of their study materials is positive, has greater advantage to achieve a final average greater than or equal to 12 (successful) than a student who does not do activities or only partially does. In this regard, this study agrees with Carrasco, Carrillo, Bazley, Vergara & Contreras (2017) about the implication of the forum, Aucancela & Eugenia (2016) in the sense that the Virtual learning System helps the learning process in approximately 85%, and De Souza, Franco & Costa (2016) about the advantage of the text to be self-sufficient, easily accessible, and portable.

On the other hand, by means of multiple regression, participation in the virtual classroom has greater impact on the variable of active participation to participation in mentoring by R2 = 0.555; That is to say, 55.5% of the total variance of the values of the active participation in the sample is explained by the regression. Also, assessment of the digital material has greater impact in the variable evaluation of teaching material to the assessment of the text and teaching guide with R2 = 0.699; That is to say, 69.9% of the total variance of the values in the evaluation of teaching material in the sample is explained by the regression. In this part, it confirms the results of Prats & Ojando (2015) in their study on academic performance enhancement using ICT they concluded that students who have used the didactic digital contents gain a significant improvement of their learning and academic performance, with an average of 20.4%.

As suggestions, these findings should lead to activities that enhance the interaction of the students both in tutoring the virtual classroom; as well as, update teaching materials—both digital (aid, readings, etc.) and DE (didactic units and Guide) printed with the aim of contributing to increasing the level of academic performance considered as satisfactory.

For future implications, further investigations should include other variables such as the studies

of higher level, digital literacy, educational practices, etc., that will expand the results obtained in this research.

Bibliographic references

Abarca, S., Gómez, T., & Venegas, C. (2015). Análisis de los factores que contribuyen al éxito académico en estudiantes universitarios: estudio de cuatro casos de la Universidad de Colima. Revista Internacional de Educación y Aprendizaje, 3(2), 125-136.

Aguilar, M. (2014). Influencia de las aulas virtuales en el aprendizaje por competencias de los estudiantes del curso de internado estomatológico de la Facultad de Odontología de la Universidad de San Martín de Porres. Tesis de doctorado, USMP, Lima.

Aguilar, I., Ayala, J., Lugo, O. & Zarco, A. (2014). Análisis de criterios de evaluación para la calidad de los materiales didácticos digitales. Revista CTS, 25(9), 73-89. Recuperado de http://www.revistacts.net/files/Volumen%209%20-%20N%C3%BAmero%2025/FINAL/AguilarFINAL.pdf

Aucancela, D., & Eugenia, M. (2016). Integración de herramientas de video-conferencia y texto en una aula del sistema virtual de aprendizaje Moodle (Master's thesis, Escuela Superior Politécnica de Chimborazo).

Arribas, J. (2014). Valoración del rendimiento académico de los alumnos de la Facultad de Educación de la UVA (Segovia) en el primer año de implantación de grado. RED. Revista de Educación a Distancia, (43).

Barceló, O & Ruano, K. (2014). Buenas prácticas en el entorno del Espacio Europeo de Educación Superior. Editorial Wanceulen Editorial Deportiva. España.

Carrasco, P., Carrillo, M. J., Bazley, K., Vergara, A., & Contreras, A. (2017). Foros virtuales y construcción de conocimiento en profesionales de la salud. Enfermería universitaria, 14(3), 184-190. https://doi.org/10.1016/j.reu.2017.06.002

Castaño, C., Maiz, I., & Garay, U. (2015). Percepción de los participantes sobre el aprendizaje en un MOOC. RIED. Revista Iberoamericana de Educación a Distancia, 18(2).

Chávez, J., Del Toro, M & López, O. (2017). Blog, Correo Electrónico y Foros Temáticos: Su Uso, Dominio y Actitud en Estudiantes de Educación Medio Superior de México. Hamut´ay, 4(2), 45-54. https://doi.org/10.21503/hamu.v4i2.1471

Dávila, N.; Garcia-Artiles, M.; Pérez-Sánchez, J.; & Gómez-Déniz, E. (2015). Un modelo de Regresion logistica asimetrico que puede explicar la probabilidad de éxito en el rendimiento académico. Revista de Investigacion Educativa, 33(1), 27-45. https://doi.org/10.6018/rie.33.1.178481

De Lucas-Santos, S. (2017). El uso de las TIC para el desarrollo de competencias con metodologías activas en Estadística Descriptiva del grado de ADE. REDU. Revista de Docencia Universitaria, 15(2), 245-256. https://doi.org/10.4995/redu.2017.7405

De Souza, S., Franco, S., & Costa, F. (2016). Educação a distância na ótica discente. Educação e Pesquisa, 42(1), 99-114. https://doi.org/10.1590/s1517-9702201603133875

Fernández-Jiménez, M., Mena-Rodríguez, E. & Tójar-Hurtado, J. (2017). Funciones de la tutoria en e-learning: Estudio mixto de los roles del tutor online. Revista de Invstigación Educativa, 35(2), 409-426. https://doi.org/10.6018/rie.35.2.273271

Flores, J. (2014). La Satisfacción Estudiantil como Indicador de la Calidad de la Educación Superior. Investigación Educativa, 7(12), 77 - 85. Recuperado de http://revistasinvestigacion.unmsm.edu.pe/index.php/educa/article/view/8178/7131

Fontainez, T. (2012). Metodología de la investigación, Caracas, Venezuela: Jupiter Editores C.A.

Gallardo, K. E., Alvarado, M. A., Lozano, A., López, C. S., & Gudiño, S. (2017). Materiales Digitales para Fortalecer el Aprendizaje Disciplinar en Educación Media Superior: Un Estudio para Comprender cómo se Suscita el Cambio Educativo. Revista Electrónica Iberoamericana sobre Calidad, Eficacia y Cambio en Educacion, 15(2), 89-109. https://doi.org/10.15366/reice2017.15.2.005

García-Barrera, A. (2016). Evaluación de recursos tecnológicos didácticos mediante e-rúbricas. RED. Revista de Educación a Distancia, 49, 1-13. . https://doi.org/10.6018/red/49/13

Garita-González, G., Gutiérrez-Durán, J. E., & Godoy-Sandoval, V. (2018). Educación a distancia: los recursos didácticos, las habilidades, las actitudes y su relación con el estudio independiente. Revista Electrónica Calidad en la Educación Superior, 9(1), 136-168. https://doi.org/10.22458/caes.v9i1.2075

Gómez, S. M. (2016). Usos y experiencias de los estudiantes con las plataformas tecnológicas y su relación con el rendimiento académico en el primer año de estudio en sistemas universitarios de educación virtual. Diálogos Pedagógicos, 12(24), 111-116.

Herrador, T. C., & Hernández, M. (2013). Un estudio del e-learning para adultos en educación universitaria a distancia: un análisis estadístico sobre el rendimiento de estudiantes de contabilidad financiera en la UNED. RIED: Revista Iberoamericana de Educación a Distancia, 16(2).

Hernández, R., Fernández, C., & Baptista, P. (2014). Metodología de la investigación, México DF, México: McGraw Hill.

Jenaro-Río, C., Castaño-Calle, R., Martín-Pastor, M., & Flores-Robaina, N. (2018). Rendimiento académico en educación superior y su asociación con la participación activa en la plataforma Moodle.

Kutugata, A. (2016). Foros de discusión: herramienta para incrementar el pensamiento crítico en educación superior. Apertura, 8(2), 84-99. http://dx.doi.org/10.18381/Ap.v8n2.887

Larreal, A. (2015). Herramientas de comunicación para el desarrollo de la inteligencia lógica matemática. Opción, 31(3), 715-734.

Montenegro, D. (2016). Interacción comunicativa con Blackboard Collaborate y el rendimiento académico en estudiantes de educación a distancia. Revista Hamut´ay, 3 (2), 68-82. https://doi.org/10.21503/hamu.v3i2.1322

Mora, D. & Bejarano, G. (2016). Prácticas educativas en ambientes virtuales de aprendizaje. Revista Aletheia, 8(2), 48-63. https://doi.org/10.11600/21450366.8.2aletheia.48.63

Pomajambo, A. (2015). Aprendizaje cooperativo en un curso virtual diseñado para docentes: un enfoque cualitativo. Tesis de maestria, PUCP, Lima.

Poveda, A. M. S. (2016). Uso de códigos QR en unidades didácticas. Posgrado y Sociedad. Revista Electrónica del Sistema de Estudios de Posgrado, 14(1), 39-47. https://doi.org/10.22458/rpys.v14i1.1491

Prats, M., & Ojando, E. (2015). ¿Pueden las TIC mejorar los resulados académicos? Diseños formativos y didácticos con soporte TIC que mejoran los aprendizajes el caso de los contenidos digitales de ortografia de Digital-Text. Educatio Siglo XXI, 33(3), 85-102. https://doi.org/10.6018/j/240841

Ramos, C., Rodrigues, L., Silva, S., & Gomes, S. (2014). Analisando Fatores que Afetam o Desempenho de Estudantes Iniciantes em um Curso a Distância. XXV Simpósio Brasileiro de Informática na Educação. https://doi.org/10.5753/cbie.sbie.2014.99

Ramos, J., Rodrigues, R., Gomes, A., & Silva, J. (2014). Análise de expectativas e habilidades discentes na modalidade de ensino a distância. In Actas de la 9ª Conferencia Ibérica de Sistemas y Tecnologías de Informacion. Barcelona-Espanha, 1, 131-136.

Rodríguez, M., & Fernández, J. (2017). Uso del recurso de contenido en el aprendizaje en línea: YouTube. Apertura, 9(1), 22-31. http://dx.doi.org/10.18381/Ap.v9n1.1018

Ruiz, C., & Dávila, A. A. (2016). Propuesta de buenas prácticas de educación virtual en el contexto universitario. RED. Revista de Educación a Distancia, (49).

Sánchez, R., & Rosales, C. (2016). Relaciones interpersonales en la tutoría en educación a distancia. Tesis Psicológica, 11 (2), 24-35.

Trangay, G., & Ruiz de la Torre, G. (2018). La educación a distancia en los subsistemas de educación superior: Avances y propuestas.

Torres-Gordillo, J., & Perera-Rodríguez, V. (2015). Factores sociales y didácticos en el proceso de aprendizaje en foros online/Social and didactic factors into learning process in online forums. Estudios Sobre Educación, 29, 143-163. https://doi.org/10.15581/004.29.143-163

Vergel-Ortega, M.; Martinez-Lozano, J.J. & Zafra-Tristancho, S.L. (2016). Factores asociados al rendimiento academico en adultos. Revista Científica, 25, 206-215. https://doi.org/10.14483/udistrital.jour.RC.2016.25.a4

Zambrano, J. (2016). Factores predictores de la satisfacción de estudiantes de cursos virtuales. RIED: Revista Iberoamericana de Educación a Distancia, 19 (2), 217-235. https://doi.org/10.5944/ried.19.2.15112