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Scientific articles

Medios de Enseñanza que favorecen el Aprendizaje en Educación Superior

Teaching Media that promote Learning in Higher Education

Mídias de ensino que promovem a aprendizagem no ensino superior

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Resumen

Los recursos y materiales didácticos son aquellos medios que utilizan los docentes para con el conjunto de ellos lograr un aprendizaje significativo en sus estudiantes y conseguir que puedan aprobar sus asignaturas. El objetivo de esta investigación fue determinar desde el punto de vista del estudiante, aquellos recursos didácticos que favorecieron directamente su aprendizaje. La investigación es de enfoque cuantitativo, diseño no experimental y corte transversal. La muestra estuvo formada por 115 estudiantes de una universidad pública. Se llevó a cabo el análisis de frecuencias, medidas de tendencia central y desviación típica, análisis factorial y el de regresión múltiple; y de acuerdo con el último estudio se confirmó

que, para los estudiantes el realizar las tareas indicadas por el docente e involucrarse en la elaboración del proyecto integrador de aprendizaje, le ayudaron directamente a aprobar la asignatura. El análisis de tendencia central indicó que realizar los ejercicios de los libros de texto, también reforzó el aprendizaje del estudiante. En conclusión, todas aquellas actividades didácticas que sean bien planificadas y ejecutadas por el docente contribuyen al aprendizaje y aprobación de las asignaturas por parte del estudiante, pero de acuerdo con la presente investigación, se encontró que algunos recursos didácticos contribuyen más en el rendimiento académico del estudiante que otros.

Palabras clave: material didáctico, recursos educativos, enseñanza superior, estudiantes, docente.

Abstract

Didactic resources and materials are the means used by teachers to facilitate meaningful learning and help students pass their courses. The objective of this research was to determine, from the students' point of view, those didactic resources that directly favored their learning. Followed a positivist paradigm, quantitative approach, non-experimental and cross-sectional design. The sample consisted of 115 students from a public university. Frequency analysis, measures of central tendency and standard deviation, factor analysis and multiple regression analysis were carried out; and according to the last study it was confirmed that, for the students, performing the tasks indicated by the professor and getting involved in the elaboration of the integrative learning project are the resources that directly helped them to pass the subject. In addition, the analysis of central tendency indicated that doing the exercises in the textbooks also reinforced student learning. In conclusion, all those didactic activities that are well planned and elaborated by the teacher contribute to the learning and approval of the subjects by the student, but according to this research, it was found that some didactic resources contribute more to the student's academic achievement than others.

Keywords: teaching materials, educational resources, higher education, students, university professors.

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Resumo

Os recursos e materiais didáticos são os meios que os professores usam para alcançar uma aprendizagem significativa em seus alunos e garantir que eles sejam aprovados nas disciplinas. O objetivo desta pesquisa foi determinar, na perspectiva do aluno, aqueles recursos didáticos que favoreceram diretamente sua aprendizagem. A pesquisa tem abordagem quantitativa, delineamento não experimental e corte transversal. A amostra foi composta por 115 estudantes de uma universidade pública. Foram realizadas análises de frequência, medidas de tendência central e desvio padrão, análise fatorial e análise de regressão múltipla; E de acordo com o último estudo, foi confirmado que, para os alunos, completar as tarefas indicadas pelo professor e se envolver no desenvolvimento do projeto de aprendizagem integrativa os ajudou diretamente na aprovação na disciplina. A análise de tendência central indicou que a conclusão dos exercícios do livro didático também reforçou o aprendizado dos alunos. Concluindo, todas as atividades de ensino bem planejadas e executadas pelo professor contribuem para a aprendizagem e aprovação das disciplinas pelo aluno, mas, de acordo com a presente pesquisa, constatou-se que alguns recursos didáticos contribuem mais para o desempenho acadêmico do aluno do que outros.

Palavras-chave: materiais didáticos, recursos educacionais, ensino superior, alunos, professors.

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Introduction

According to each school's procedures, teachers are typically asked to plan their lessons before the start of the semester. To this end, among other aspects, they employ a series of teaching resources or activities to reinforce concepts and assess student learning. Commonly used resources can be traditional, such as classroom activities and whiteboard explanations, or include technological tools such as online videos, Kahoot activities, and discussion forums. Given the wide variety of teaching materials available, teachers, based on their experience and judgment, determine which are most effective in the teaching-learning process. In order to be more precise regarding the advantages offered by each method over the other, it was decided to analyze from the student perspective those elements that directly contribute to the meaningful learning of the Programming Methodology course. This course is taken by all the Faculty's programs as part of their comprehensive training. Its objective is

to develop their logical thinking while learning the basic elements, such as selective and repetitive structures and structured data, which they will later use in programming languages. In addition, over the last three years, the first-time failure rate for this course has been found to range between 60% and 70%. Therefore, the aim is to offer teachers those elements that allow them to focus primarily on activities that generate greater academic achievement for students, thus being able to influence, in one way or another, the reduction of the failure rate.

In this context, learning is understood as the change in behavior or repetition of activities with minimal errors. Meaningful learning is achieved when students are able to transform content into meaning, in a way that they can understand, incorporate, and relate it to what they already know (Villacreses Veliz et al., 2016).

Teaching aids are those that allow students to develop their thinking, language, imagination, and self-knowledge. Furthermore, teaching resources, according to Fernandez (2010), are all those elements such as tools, procedures, activities, techniques, and strategies that support the teacher's activities, so that students can receive knowledge more clearly to achieve meaningful learning. Before teaching the class, teachers must properly plan and select those resources that will help them effectively carry out the teaching-learning process. Teaching materials are objects that help in the construction of learning (Fernandez A., 2010) and can be any designed device or element oriented to the development of formative activities (Rojas Matamoros et al., 2021). They can be both physical and virtual (Vargas Murillo, 2017). In this way, it can be said that resources play a role as mediators between the educational objective and the teaching-learning process, between the educator and the student (Blanco Sánchez, 2012).

Some teaching aids can be: Text, blackboard, interactive audiovisual material, student participation, teamwork, exercises, among others (Villacreses Veliz et al., 2016). Within the teaching aids, digital ones can also be included, since it provides some advantages such as having a larger group of students and, in some cases, the platform itself includes tools for more efficient feedback and communication, so that strategies can be oriented to the requirements of each student (Gadzaova et al., 2021).

According to Díaz Lucea (1996), materials and resources must cover one or more of the following functions:

- Motivational function: they must have the ability to capture the student's attention, whether through their shape, color, action, sensation, among others.

- Structuring function: they can become the means of organizing learning between reality and knowledge.
- Didactic function: There must be consistency between the content to be covered and the resources that can be used for teaching efficiency.
- Learning facilitating function: Essential materials for learning can be identified, as well as those that are merely facilitators.
- Teacher support function: This is the need for teachers to have resources that support them in their teaching work, such as topic programming, teaching, data recording, monitoring, etc.

resources can be classified as follows:

- Printed and handwritten documents, which may include: books, magazines, newspapers, maps, or others.
- Audiovisual and computer documents, such as: videos, electronic resources, photographs, among other media.
- Manipulative materials such as: interactive boards, laboratory modules, games, balls, among others.
- Equipment such as: computer, projector, electric board.

According to Fernandez (2010), they are classified as intangible and tangible. The former are those involved in mental processes such as teaching and learning strategies, techniques, readings, or document creation. Tangible materials are teaching materials.

Digital didactics is defined as an educational process that incorporates the use of the internet and other technologies to optimize teaching in modern environments. Some examples of programs that support learning through this perspective are: Edublog, a series of blogs used for educational purposes; Wiki, web pages that allow collaborative work, as they are updated by volunteer users; Hot Potatoes, a series of short-answer exercises, multiple-choice puzzles, crossword puzzles, etc.; and WebQuest, a guided investigation that allows for cooperative work and student autonomy, which is assessed (Vargas Murillo, 2017).

Among the communication tools that we can consider at this level of teaching are: chats, emails, forums, and distribution lists (Sagan et al., 2020). Some reasons to think that forums are good elements to include in the learning process are that: they can be carried out at different times and spaces, students can work with other classmates, it promotes cooperation, they can share doubts and support each other, they feel accompanied, among

others (Eusebio Hermira, 2023). Among the benefits of digital resources, such as animation, audio, images, videos, and interactive exercises, is that they increase students' interest and curiosity (Granda Asencio et al., 2019). Although digital teaching resources are an excellent option to motivate students, teachers must organize the learning process by working hard to prepare educational content and improvement methods, in addition to selecting the platform that best suits their objectives, without neglecting adequate training in its use (Azamat Raelovich et al., 2020).

In their educational work, teachers have at least three tasks: organizing materials and other information for student learning, using various formats such as text, images, and/or readings; explaining the procedures for understanding both generally and specifically; and allowing students to assimilate the information provided, reason it, analyze it, and ultimately transmit it (Gadzaova et al., 2021).

In course planning, the teacher is responsible for the design and development of daily tasks that make up the teaching material, which can be defined according to Camacho González (2020) as physical or virtual resources that help in the development of activities and content, covering different contexts and with specific objectives. It is pertinent to mention that all those resources or materials that the teacher decides to integrate into their planning must be perfectly integrated and synchronized to achieve meaningful learning, but they must also consider the educational context (school, social, regional, etc.) in which said process will be developed so that it is effective and motivates students (Blanco Sánchez, 2012).

Teaching experience indicates that under favorable circumstances, even the weakest students possess knowledge, skills, and communication skills. Sometimes, in these situations, teachers must include methods and resources for their success. Teachers often organize resources to achieve meaningful learning for most of their students, but unfortunately, it is inevitable that some students will not achieve this (Gadzaova et al., 2021). Therefore, learning methods must be organized to cover students with different abilities. When teaching, different didactic strategies must be used to encourage student participation, since if only one method is used, what is being done is training, not educating (Matienzo, 2020).

The objective of this research is to identify, from the student's perspective, those teaching resources used in the Programming Methodology course that effectively contributed to their learning and, thus, to pass the course. The main objective of this course is to develop students' programming logic through the use of selective, repetitive structures and structured

data. Keeping in mind the criteria presented previously, it was decided to propose the following research question: Which teaching resources directly contribute to student learning? In accordance with this approach and to achieve greater accuracy in the answers that could be offered, three hypotheses were established: (a) The teaching activities carried out during the course contribute to student learning; (b) Participating in class and taking notes appropriately promote student learning; and (c) Performing individual reinforcement activities promote student learning.

Materials and methods

Research Design

The research design has a quantitative approach, being objective and results-oriented. This means that it incorporates a series of components and measurement techniques, allowing for the empirical verification of social facts. Furthermore, it seeks to achieve the stated objective, generate knowledge, and confirm or reject the defined hypotheses (Ortiz Arellano, 2013). A non-experimental, empirically-analytically oriented methodology was used to measure the effect of the independent variables on the dependent variable. A cross-sectional design was adopted, as data collection was carried out at a single point in time, with the purpose of describing the interrelationships between the variables (Hernández Sampieri et al., 2014).

As Ortiz Ocaña (2015) explains, the methodology describes the research procedure, unlike the approach, which is more general and indicates the direction of the research, but it is very difficult to separate them, since the direction of the research and the way it is carried out are completely related and it is practically impossible to separate them.

The research is of descriptive design since it seeks to determine the impact of the characteristics of one or more variables in a population and for the phenomenon in question, it is intended to determine its characteristics and properties (Hernández Sampieri et al., 2014).

Participants

The population consisted of university students who passed the Programming Methodology course on the first try, including all the programs that are part of the school since, according to Hernández Sampieri et al. (2014), the population is the set that includes all the cases that meet a series of specifications. According to Hernández Sampieri et al. (2014), the sample is a subgroup of the population from which data will be collected and which must be representative of the population. In accordance with the central limit theorem, the sample was 115. The students surveyed were in their second and third semesters of the different bachelor's programs at the faculty.

Measuring instrument

The data collection instrument consisted of 11 questions organized into three dimensions: Didactic Activities, Participation and Notes, and Self-Study. The instrument was administered to students virtually using the Microsoft Forms platform. According to Hernández Sampieri et al. (2014), although several tools and instruments are available for data collection, the most commonly used is the questionnaire, which consists of a set of questions regarding one or more variables to be measured. A Likert scale was used to display the response options for students, giving them five options so they could select the one that best suited their needs: strongly agree, agree, undecided, disagree, and strongly disagree. Students were given a two-week period to submit their responses. Once this period was over, the same platform allows students to download an Excel file with the student's responses to each of the instrument's questions. This file was used to generate the corresponding studies.

Procedure

The instrument was developed electronically using the tools provided by the platform. Once completed, a link containing the instrument questions was generated. The link was distributed to students in the different second- and third-semester groups across all the department's programs. A two-week period was allowed to allow for responses. The form was marked as closed once the period concluded. A file containing the responses was subsequently generated through the platform.

The data was analyzed to retain only those responses that met two criteria: all survey questions were answered, and the student had passed the course on the first try, meaning it

was their first time taking the Programming Methodology course. Once this analysis was completed, the complete document was available for analysis, consisting of 115 valid responses.

Data Analysis

The file containing the answers provided by the students was again reviewed for completeness, and all those that did not meet this requirement were discarded. Data analysis was subsequently carried out using IBM SPPS Statistics software. According to IBM (2024), this statistical approach program allows the management and analysis of large volumes of data through an intuitive interface, facilitating the performance of comprehensive analyses. The studies carried out were: Frequency Analysis, Measures of Central Tendency and Standard Deviation, Factor Analysis, and Multiple Regression Analysis.

Results

To evaluate the internal reliability of the instrument, Cronbach's Alpha coefficient was used, obtaining a value of 0.77.

Once the surveys were administered through MS Forms, and with the Excel generated from that platform, adjustments were made to the variables' data types so they could be managed in the IBM SPPS Statistics program and the analyses could be generated. As previously indicated, the graphs and tables corresponding to the four studies were generated. The results obtained in each are detailed below.

Frequency Analysis

The study of the frequencies was carried out for each of the variables of the instrument, which makes it possible to identify the frequencies obtained by each of them according to their category (Hernández Sampieri et al., 2014).

In the *teaching activities dimension* , the frequency analysis for the variable *Carrying out the tasks indicated by your teacher contributed to passing the subject* , indicates that: 80 (69.6%) totally agreed, 28 (24.3%) agreed, 5 (4.3%) were undecided and 2 (1.72%) disagreed. For the variable *Doing the exercises in the textbook, or those indicated by your teacher, did they help you pass the subject?* , indicates that: 56 (48.7%) totally agreed, 37 (32.2%) agreed, 12 (10.4%) were undecided, 7 (6.1%) disagreed and 3 (2.6%) totally

disagreed. Finally, for the variable *Getting involved in the development of the final project, did it contribute to you passing the subject?*, they indicate that: 79 (68.7%) totally agreed, 22 (19.1%) agreed, 9 (7.8%) were undecided, 2 (1.7%) disagreed and 3 (2.6%) totally disagreed.

For the *participation and notes dimension* , the frequency analysis of the variable *Attending classes regularly, did it help you pass the subject ?,* indicates that of the students: 67 (58.3%) totally agreed, 35 (30.4%) agreed, 8 (7.0%) are undecided, 4 (3.5%) disagreed and 1 (0.9%) totally disagreed. For the variable *participating in classes, Did it contribute to you passing the subject ?,* indicates that of the students: 44 (38.3%) totally agreed, 32 (27.8%) agreed, 21 (18.3%) are undecided, 10 (8.7%) disagreed and 8 (7.0%) totally disagreed. For the variable *participating in forums, did it contribute to you passing the subject ?* , the students point out that: 25 (21.7%) totally agreed, 16 (13.9%) agreed, 32 (27.8%) were undecided, 13 (11.3%) disagreed and 29 (25.2%) totally disagreed. For the variable *having your complete notes, did it make it easier for you to pass the subject* ?, the students point out that: 59 (51.3%) totally agreed, 34 (29.6%) agreed, 12 (10.4%) were undecided, 5 (4.3%) disagreed and 5 (4.3%) totally disagreed.

Finally, in the *Self-study dimension* , the frequency analysis for the variable *studying for exams, Did it help you pass the subject ?* , indicates that for: 59 (51.3%) they totally agreed, 40 (34.8%) agreed, 11 (9.6%) were undecided, 1 (0.9%) disagreed and 4 (3.5%) totally disagreed. For the variable *Reading and studying from the textbook, did it help you pass the subject?* , indicates that for: 25 (21.7%) they totally agreed, 36 (31.3%) agreed, 29 (25.2%) were undecided, 14 (12.2%) disagreed and 11 (9.6%) totally disagreed. For the variable *Reinforcing your learning through means (tutoring, YouTube, etc.) outside of class, did it contribute to you passing the subject?* , it indicates that for: 64 (55.7%) totally agreed, 28 (24.3%) agreed, 12 (10.4%) were undecided, 5 (4.3%) disagreed and 6 (5.2%) totally disagreed. For the variable *Reviewing the topics seen in class, did it help you pass the subject?* , it indicates that for: 62 (53.9%) totally agreed, 39 (33.9%) agreed, 10 (8.7%) were undecided and 4 (3.5%) totally disagreed.

Measures of Central Tendency and Standard Deviation

Measures of central tendency allow us to know where the data accumulate according to the Open and Distance University of Mexico (2019), and the mean is one of the most common measures in this type of studies, which is obtained by adding all the scores and dividing by the total scores. For quantitative studies, this is very common, since it helps

compare the results of some groups with others (McMillan and Schumacher, 2010). The analysis of central tendency is carried out by dimension, of which three are being handled in this case, in addition, due to what was previously stated, the mean was selected as part of the analysis. Finally, the results obtained were compared with the Likert scale used to obtain some conclusions that this study can provide.

The analysis showing the trend in the *Teaching Activities dimension* indicates, according to Table 1, that the items range from a mean of 1.38 to a mean of 1.82, indicating that students' responses fluctuated between "strongly agree" and "agree." These results suggest that, according to students' perceptions, completing teaching activities such as homework, projects, and exercises prescribed by teachers significantly contributes to passing the Programming Methodology course.

Table 1. Dimension: Teaching Activities

	N	Minimum	Maximum	Average	Standard deviation
Did completing the tasks indicated by your teacher contribute to passing the subject ?	115	1.0	4.0	1.38	0.66
Did your involvement in the development of the final project help you pass the course ?	115	1.0	5.0	1.50	0.91
Did completing the exercises in the textbook or those indicated by your teacher help you pass the subject ?	115	1.0	5.0	1.82	1.02
N valid	115				

Note: Scale: 1. Strongly agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly disagree.

Source: Prepared by the authors (2024).

The analysis of the trend for *Participation and Notes* shows the results in Table 2, and it is observed that the trend oscillates between an average of 1.58 and an average of 3.04; positioning the responses between agree and undecided, so that according to the students' perception, attending classes, participating, taking notes and participating in forums do not contribute significantly to the passing of the subject.

Table 2. Dimension: Participation and notes

	N	Minimum	Maximum	Average	Standard deviation
Did attending classes regularly make it easier for you to pass the subject ?	115	1.0	5.0	1.58	0.84
Did having your notes complete make it easier for you to pass the subject ?	115	1.0	5.0	1.81	1.08
Did participating in class help you pass the subject ?	115	1.0	5.0	2.18	1.23
Did participating in forums help you pass the subject ?	115	1.0	5.0	3.04	1.46
N valid	115				

Note: Scale: 1. Strongly agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly disagree.

Source: Prepared by the authors (2024).

Finally, for the *Self-study dimension* , Table 3 shows that student responses ranged from a mean of 1.62 to a mean of 2.56, indicating that student responses ranged from "agree" to "undecided," that is, students consider that studying, reviewing, and reinforcing topics do not significantly contribute to passing the course.

Table 3. Dimension: Self-study

	N	Minimum	Maximum	Average	Standard deviation
Reviewing the topics covered in class, did it help you pass the subject ?	115	1.0	4.0	1.62	0.79
Studying for exams, did it help you pass the subject ?	115	1.0	5.0	1.70	0.94
Reinforcing your learning through other means (tutoring, YouTube, etc.) outside of class, did it help you pass the subject ?	115	1.0	5.0	1.79	1.13
Reading and studying from the textbook, did it help you pass the subject ?	115	1.0	5.0	2.56	1.23
Valid N (by list)	115				

Note: Scale: 1. Strongly agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly disagree.

Source: Prepared by the authors (2024).

Factor Analysis

Factor analysis allows for the grouping of variables that are correlated and that share some characteristic, thereby finding the minimum number of dimensions while still being able to explain the maximum amount of information (De la Fuente Fernández, 2011). For this research, factor analysis was performed for each of the three dimensions, resulting in the following form.

The results for the *Didactic Activities dimension* are shown in Table 4, and it can be seen that two factors were identified. Factor 1: Includes the completion of tasks and the development of the Integrated Learning Product (ILP); for the purposes of this study, it has been named *Tasks and ILP* ; and Factor 2: Considers the completion of exercises; it has been called *Exercises* .

Table 4. Factorial Composition of the Didactic Activities Dimension

Rotated component matrix		
	Component	
	1	2
Did completing the tasks indicated by your teacher contribute to passing the subject ?	.88	
Did your involvement in the development of the final project help you pass the course ?	.72	.32
Did completing the exercises in the textbook or those indicated by your teacher help you pass the subject ?		.97

Note: Source: own elaboration (2024).

The factor analysis of the *Participation and Note-Taking dimension* identified two factors, as shown in Table 5. Factor 1: Considers student participation in forums and during classes; it has been named *Individual Participation* . Factor 2 considers: Class attendance and note-taking; it has been labeled *Attendance and Note-Taking* .

Table 5. Factorial Composition of the Participation and Notes Dimension

Rotated component matrix		
	Component	
	1	2
Did participating in forums help you pass the subject ?	.88	
Did participating in class help you pass the subject ?	.84	
4 - Did attending classes regularly make it easier for you to pass the subject ?		.81
8 - Did having your notes complete make it easier for you to pass the subject ?		.77

Note: Source: own elaboration (2024).

According to the factor analysis of the *Self-Study dimension* , two factors were generated, as shown in Table 6. In Factor 1: Activities were grouped in which the student can review the topics covered in class and study for exams; this has been named *Study and Review* . In Factor 2, the following are considered: reinforcing topics through other means (chosen by the student) and studying the textbook, which has been named *Reinforcing Topics* .

Table 6. Factor Composition of the Self-Study Dimension

Rotated component matrix		
	Component	
	1	2
Reviewing the topics covered in class, did it help you pass the subject ?	.87	
Studying for exams, did it help you pass the subject ?	.71	.32
Reinforcing your learning through other means (tutoring, YouTube, etc.) outside of class, did it help you pass the subject ?		.92
Reading and studying from the textbook, did it help you pass the subject ?	.50	.54

Note: Source: own elaboration (2024).

Multiple Regression Analysis

According to Hernández Sampieri et al. (2014), multiple regression analysis is used to identify the independent variable(s) that best describe the dependent variable. For this study, the dependent variable is Course Pass, and the independent variables, based on the factors obtained in the previous analysis, are: Tasks and ILP; Exercises; Individual Participation; Attendance and Note-Taking; Study and Review; and, finally, Reinforcing Topics.

The independent variables whose significance value (Sig) is less than 0.05 are those that describe the dependent variable (Montero Granados, 2016). According to this analysis, it is observed in Table 7 that the independent variable *Tasks and Integrated Learning Product (ILP)* has a significant correlation with the dependent variable *Course Pass.*

Table 7. Multiple Regression Analysis

Model	Standardized coefficients	Next.
	Beta	
(Constant)		.00
Tasks and PIA	.48	.00
Exercises	.08	.37
Individual Participation	.04	.64
Attendance and Notes	-.12	.23
Study and Review	.08	.42
Reinforce Topics	-.06	.50

Note: Dependent variable: Course Pass.
Source: own elaboration (2024).

Discussion

In the present study, three hypotheses were proposed, the results of which were as follows:

(a) The teaching activities carried out during the course contribute to student learning. According to the multiple regression analysis, this hypothesis is confirmed; that is, the students surveyed believe that completing the tasks assigned by the teacher and participating in the development of the learning project contribute significantly to their learning of the subject and, consequently, to their passing grade.

(b) Participating in class and taking complete notes benefit student learning. Based on the studies conducted, this hypothesis is refuted; that is, students do not believe that attending class regularly, participating and taking complete notes, and participating in forums directly impact their learning and passing the course.

(c) Individual reinforcement activities enhance student learning. This hypothesis is refuted by the analysis; that is, for students, reviewing the topics covered, relying on the textbook, and reinforcing their studies with external support do not determine whether they learn the subject or pass it.

The implementation of diverse didactic activities in class is essential, since, although all contribute to learning to some extent, some have a more significant direct impact. Furthermore, the use of Information and Communication Technologies (ICT) offers several advantages, as indicated by Granda Asencio et al. (2019), including providing platforms that allow students to work cooperatively and collaboratively, which contributes to the development of learning skills.

As can be seen in this study, students do consider that carrying out learning projects directly benefits their learning, as indicated by Toledo Morales and Sánchez García (2018). The advantages of this type of teaching activities are that they provide content knowledge, as well as the development of skills, problem-solving, critical thinking, and collaboration among those involved. In addition, it generates an increase in motivation when faced with real-life topics (Villanueva Morales et al., 2022).

By studying measures of central tendency and standard deviation, it can be observed that students confirmed that when they complete the didactic activities, this contributes significantly to their learning and passing the course . Among the didactic activities included in this section are the tasks assigned by the teacher, either to be completed during class or at home for later submission in person or remotely through a digital platform.

Also considered as a favorable element to pass the subject was the completion of exercises and content of the textbook(s) and in this sense, according to Rodríguez Hidalgo (2013), he mentions that textbooks help the teacher to cover some training gap, as well as support for the individual work of the student, in addition to relating theory and practice, thus achieving learning in an active and committed way.

Based on the results of this research, it is suggested that teachers be encouraged to use integrative learning projects, whether one or several throughout the course. We should also pay special attention to the reinforcement tasks we assign to students, whether individually or in teams, as these have proven successful in improving student learning and thus making passing grades more likely. However, it is important to emphasize that a limitation of the research is that it was conducted with a sample of students from a course related to the logic of thought and in a faculty with an academic focus on the exact sciences.

Conclusions

According to the results obtained from the multiple regression analysis of this research, it can be concluded that students believe that completing the tasks assigned by the teacher and being directly involved in the development of integrative learning projects are the main teaching resources that most helped them acquire the knowledge and skills required to pass the course. Furthermore, according to the results generated by the central tendency analysis, it can be concluded that students completing exercises in the textbook(s) for the course is also a factor that can help them pass the course. It is worth emphasizing that all teaching activities well planned by the teacher and appropriate to the students' profile and needs

contribute to their learning. However, as observed, not all of them achieve the same degree of impact on the acquisition of skills and knowledge, some more than others. However, it is very important to include them in a planned manner in the teaching process.

Future lines of research

Based on the results obtained in this research, we suggest that teachers involved in subjects with a similar profile place greater emphasis on the aforementioned teaching resources to achieve meaningful learning among their students and ensure they pass their courses. Furthermore, for future research, based on previous findings, we propose determining the extent to which the use of information and communication technologies would or would not generate greater motivation in students to complete the activities taught by their teachers, thereby developing the required knowledge and skills. Another proposal is to expand this research to include students from other faculties where programs related to the exact sciences are not the only ones being studied.

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