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Artículos científicos

Percepción estudiantil de un curso universitario que integró los recursos de Google como apoyo educativo

Student Perception of the Evaluation of a University Course Integrating Google Resources as Educational Support

Percepção do aluno sobre um curso universitário que integrou recursos do Google como suporte educacional

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Resumen

Actualmente, dadas las exigencias del mundo actual, se está experimentado un cambio en la forma de aprender y de enseñar. Los implicados en el proceso educativo se han visto en la labor de incorporar las tecnologías de la información y la comunicación (TIC) en la educación. El objetivo de este estudio fue conocer la percepción estudiantil de un curso universitario que integró los recursos de Google como apoyo educativo. Para ello, se realizó un estudio de carácter descriptivo enfocado en una investigación de campo. La recolección de la información se hizo mediante un cuestionario estructurado con 36 preguntas, que fueron evaluadas con una escala de Likert del uno al cinco, más dos preguntas adaptadas a 27 estudiantes. La información obtenida fue procesada con ayuda del programa informático Microsoft Excel. Los resultados muestran que el grupo de alumnos que cursó la asignatura manifestó gran motivación en el desarrollo de las actividades programadas, al igual que un gran interés por aprender cada una de las herramientas de Google que integró la materia. Se concluye que, debido a su facilidad de uso, acceso gratuito y características, los escolares

percibieron de forma positiva la integración de los recursos de Google como apoyo educativo en la asignatura. Los recursos que más destacaron fueron Documentos, Formularios, Tasks, Sites y Gmail.

Palabras clave: educación superior, formación universitaria, Google, valoración.

Abstract

Currently, given the demands of today's world, a change is being experienced in the way of learning and teaching. Those involved in the educational process have seen themselves in the work of incorporating information and communication technologies (ICT) in education. The objective of this study was to know the student perception of a university course that integrated Google resources as educational support. For this, a descriptive study was carried out focused on a field investigation. The information was collected through a structured questionnaire with 36 questions, which were evaluated with a Likert scale from one to five, plus two questions adapted to 27 students. The information obtained was processed with the help of the Microsoft Excel computer program. The results show that the group of students who took the subject showed great motivation in the development of the programmed activities, as well as a great interest in learning each of the Google tools that integrated the subject. It is concluded that, due to its ease of use, free access and characteristics, schoolchildren positively perceived the integration of Google resources as educational support in the subject. The resources that stood out the most were Documents, Forms, Tasks, Sites and Gmail.

Keywords: higher education, university education, Google, valuation.

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Resumo

Atualmente, diante das demandas do mundo atual, está ocorrendo uma mudança na forma de aprender e de ensinar. Os envolvidos no processo educacional têm se envolvido no trabalho de incorporação das tecnologias de informação e comunicação (TIC) na educação. O objetivo deste estudo foi conhecer a percepção dos alunos sobre um curso universitário que integrou recursos do Google como suporte educacional. Para isso, foi realizado um estudo descritivo com foco em uma investigação de campo. As informações foram coletadas por meio de um questionário estruturado com 36 questões, as quais foram avaliadas em uma escala Likert de um a cinco, mais duas questões adaptadas para 27 alunos. As informações obtidas foram processadas com auxílio do programa de computador Microsoft Excel. Os resultados mostram que o grupo de alunos que cursou a disciplina demonstrou grande motivação no desenvolvimento das atividades programadas, bem como grande interesse em aprender cada uma das ferramentas do Google que integram a disciplina. Conclui-se que, pela facilidade de uso, livre acesso e características, os escolares perceberam positivamente a integração dos recursos do Google como suporte educacional na temática. Os recursos que mais se destacaram foram Documentos, Formulários, Tarefas, Sites e Gmail.

Palavras-chave: ensino superior, ensino universitário, Google, avaliação.

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Introduction

In order to cope with current demands in the educational and work environment, not only is it enough to accommodate technological tools, but it is also necessary to find the best way to use them in each context. Information and communication technologies (ICT) are capable of promoting more effective and much cheaper learning than face-to-face education. At the Technological Institute of Milpa Alta (Mexico City), where this project was carried out, the board of directors is committed to caring for the environment and the resources used in the teaching process. This has caused that, in the educational process, academic heads ask teachers the greatest care in resources: copies, exams and portfolios of evidence. To this end, various strategies have been promoted, ranging from cloud storage for the evidence portfolio (Dropbox) and using learning management systems (LMS) to take exams to implementing platforms for managing meetings in a way synchronous (for example, Teams) or the use of

blogs to share information with students. Likewise, all teachers have an institutional Gmail account, and with it many of Google's educational tools. However, few teachers are aware of the benefits of having this service; most only use it to send and receive information by email. This is precisely due to the lack of knowledge of the range of tools that Google offers in the field of education.

Taking into account the above, the idea of this research arose: to know the student perception of a university course that integrates Google resources as educational support. And thanks to the support of the Milpa Alta Technological Institute, the idea materialized and could be applied with students who took the subject Production Management II, which is part of the engineering program in Business Management. Thus, the main objective was to know the perception and student evaluation of a university course that integrated Google tools as educational support. In addition, tangentially, it examines, through the lens of schoolchildren, the potential of Google tools in education. It should be noted that the research was carried out during the post-doctorate course in Educational Technology at the Center for Studies and Research for Teacher Development (Cenid).

Finally, following Brodersen and Mellluzo (2017), it is worth noting that in the current age blended learning is only possible if a synergy is achieved between traditional classes in the classroom and electronic learning..

Incursion of ICT in education

There are several efforts that have documented the implementation of ICT in education and the impact they have caused. For example, Claro (2010) developed a study on the effect that ICTs have on student teaching. In conclusion, the author emphasizes that in order to obtain positive results in learning, the conditions of access to ICT must be adequate. Rodríguez (2010), for his part, carried out an investigation on the relationship between the use of ICT and teaching at the university. Here it is emphasized that, to obtain positive changes in education, both teachers and the use of ICT and teaching strategies must be directed towards the same goal. Likewise, Ávila and Riascos (2011) measured the impact of ICT on teaching-learning processes in higher education. In the conclusions, they emphasize the incursion of ICTs in the educational field and the need to constantly evaluate their use. Buxarrais and Ovide (2011) set out to expose the benefit of using ICT in education. According to these researchers, implementing ICT in teaching has a significant effect on the

training of students: it prepares them to meet the demands of the labor market. While Monsalve (2011) evaluated the implementation of ICT in students' learning activities and concluded that, when using ICT, students showed greater interest and greater confidence in the learning process, among other things .

On the other hand, Vera (2012) investigated the opinion of teachers about the insertion of ICT in the teaching-learning process. The results obtained from the study showed that the teachers considered the use of ICT as an important resource to be able to develop their teaching work. Cuen and Ramírez (2013) carried out a study involving the effects, functions and use of ICT in teachers and university students, whose purpose was to evaluate learning. The results of the study demonstrated a positive roots within the educational process with ICT by teachers, as well as students.

Santiago, Caballero, Gómez and Domínguez (2013) carried out a study of the use and application of ICT in students from primary schools in Mexico. In this case, the authors suggest that in order to obtain positive results, it is necessary to reinvigorate the training in the teaching staff and provide support to them; thus, a significant impact will be obtained in primary education. Botello and Guerrero (2014) developed a study where the impact of ICTs on Latin American students was evaluated and how this is reflected in their performance. The results were satisfactory, as they reflected an improvement in the academic performance of the students.

Another of the studies in this branch is that of Echeverría (2014), who inquired about the employability of ICT by university professors. Teachers, concludes Echeverría (2014), show good behavior to include ICT within their teaching practice. At the same educational level, Javier, Romero and Rico (2014) sought to evaluate the use and impact of ICT in students from two university careers. The result obtained was that the students of both careers have a notion of the use of ICT. In addition, it is highlighted that the socioeconomic factor is a key differentiator in the use of these new technologies. Grájeda (2015) carried out an investigation whose purpose was to demonstrate whether students develop better learning when using Web 2.0. In the end, the author emphasizes above all collaborative learning. It is also worth mentioning the work of Rodríguez (2015), who evaluated the benefit of using ICT with students with intellectual disabilities.

Finally, the studies by Gómez, Contreras and Gutiérrez (2016), Plascencia and Beltrán (2016), Esparza (2017), García-Valcárcel and Tejedor (2017), Hernández (2017) and

Mejía and Gómez (2017), although each one has its peculiarities, in the end they lean in the same direction: the positive impact generated by the implementation of ICT in the classroom.

Previous studies on the use of Google in education

López, Ledesma and Escalera (2009) mention that the elements and considerations to take into account in a virtual learning environment are interaction, trust, accessibility and motivation. Gómez (2011) particularly valued the effect that the use of Google Earth has on first-grade secondary school students. The work concludes that the first grade students, for the most part, present positive results when using this resource. According to González (2011), Google's Docs, Groups and Academic tools are of great help during teaching practice. Castellanos and Martínez (2013), for their part, measured the experience of students when participating in a collaborative activity using Google Drive. The results obtained were, firstly, the ease of handling this resource, and secondly, how simple it was to form and participate in online work groups. Galantini (2015) developed a study whose purpose was to use the Google Site tool in the learning of graduate students. And she found a significant correlation between the use of the tool and the following variables: distribution of virtual books, planning of virtual forums and organization of virtual notebooks

Like what happens in the previous cases, there is an extensive list of works that conclude in the usefulness of Google's educational tools (Gmail, Drive, Docs, Sites, Forms, etc.) throughout the teaching process- learning and the benefit they bring to each of the actors involved in it: managers, teachers and students (Almeida, Chuco y Lavado, 2015; Barrios, 2017; Barrios y Casadei, 2014; Delgado y Casado, 2013; Huzco y Romero, 2018; Quinatoa, 2015; Martínez, 2016; Roda y Sassano, 2016; Suárez, 2018; Tolosa y García, 2011; Vilela, Purihuamán y Nuñez, 2016; Zambrano, 2015).

Materials and method

Type of study

It is a descriptive investigation. In addition, it was conceived as descriptive transectional, since it was carried out at a single moment in time on a specific group. (Hernández, Fernández y Baptista, 2003).

Participants

The research population was made up of students from the subject of Production Management II, which is part of the sixth semester subjects of Engineering in Business Management at the Milpa Alta Technological Institute. The number of students enrolled and taken into account for the research was 27 schoolchildren.

Instrument

To measure the quality of the course, the Santoveña (2010) questionnaire was used and adapted. This questionnaire is organized in three main dimensions: 1) General quality of the environment and the didactic methodology (from items 1 to 17), 2) Technical quality: navigation and design (from items 18 to 26) and 3) Technical quality: resources multimedia (from item 27 to 36). Regarding reliability, the first dimension had a Cronbach's alpha value of 0.945, the second of 0.932 and the third of 0.924. It should be noted that two more items were added to the questionnaire in question: one of them evaluated prior knowledge of Google resources and the second measured the degree of satisfaction with each Google tool used in the matter. For the case of this pair of items, the questions of the study of Delgado and Casado (2013).

Process

Phase zero

The study program of the subject was studied in order to know the topics, the learning activities and the competences that the subject dictates. An analysis of Google resources was also carried out with the activities that are required to be incorporated to achieve meaningful learning in students. Finally, two diagnoses were carried out: the first was of Google tools and the second was to know the use that students give to ICT.

Phase one

The outline of the selected subject was drawn up (figure 1). For this, the Google Sites resource was used, which served as support for the matter. and in which the tools selected in the previous stage were included. Likewise, the learning activities of the course were designed, paying special attention to the way of sequencing and organizing the content. The classic Site template sketch was used, which is default and was created by Montañana (2017).

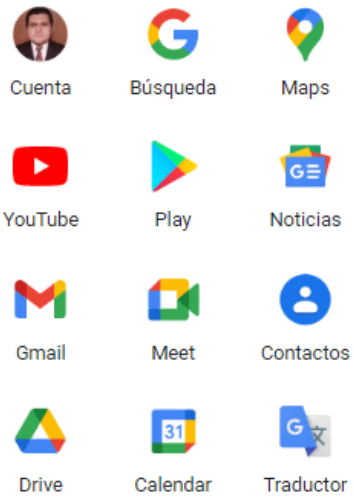
Figura 1. Plantilla predeterminada de Sites

Fuente: Montañana (2017).

Phase two

The site of the chosen subject was created by combining the selected Google resources. The tools that were used are those shown in figure 2 (neither the chat nor the calendar was used).

Figura 2. Recursos de Google utilizados.



Fuente: Google (2019)

Each of the resources used in this research is briefly described below:

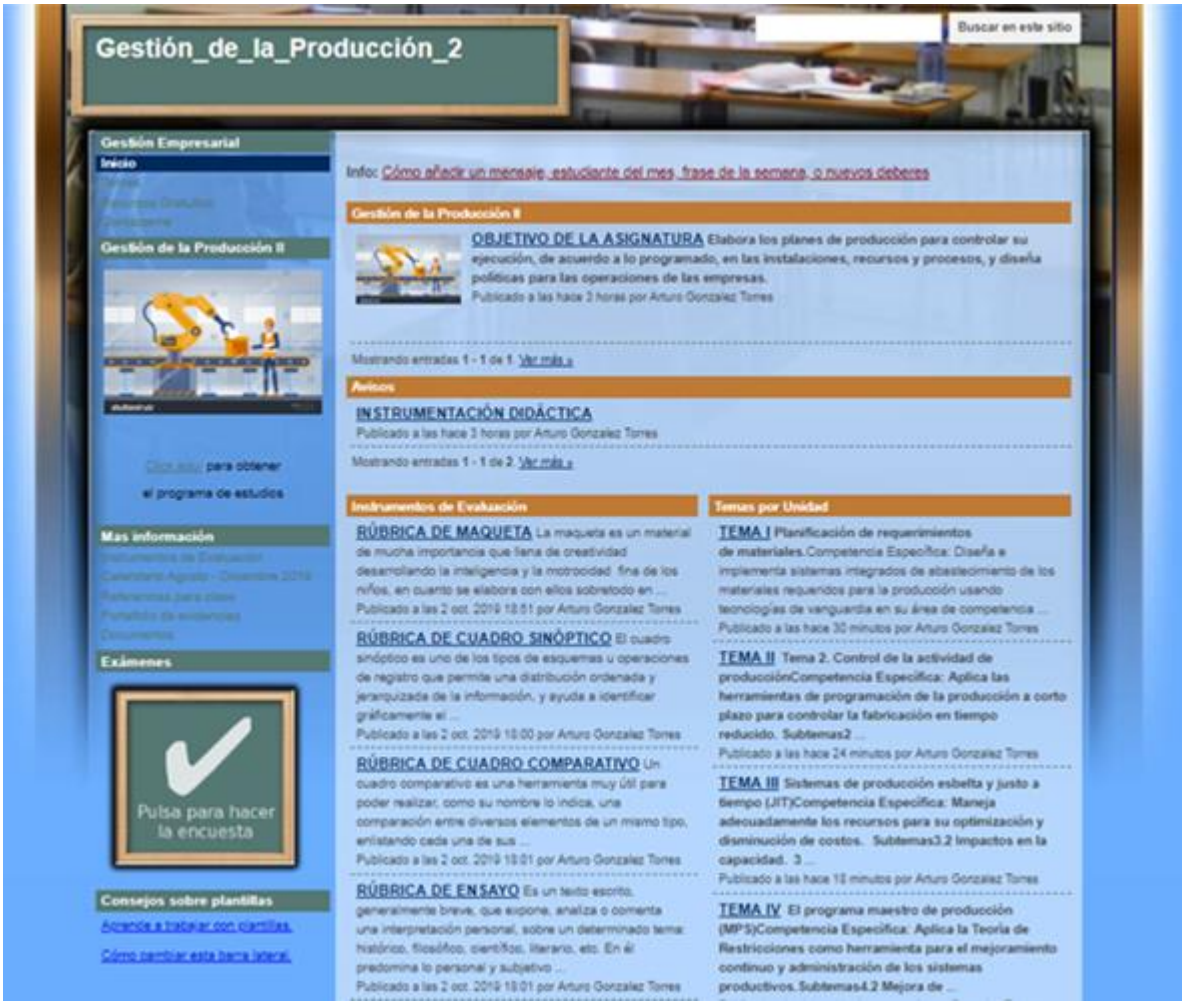
- Google Site. It allows the creation of websites in a safe and dynamic way.

- Google Meet. It allows the realization of videoconferences accessing with a meeting code.
- Google Drive. It allows the creation of materials, which can be saved and shared.
- Google Documents. Allows you to carry out work online, share documents, files or folders.
- Google Spreadsheets. It allows the creation, editing and collaboration of spreadsheets individually or also collaboratively.
- Google Presentations. It allows the creation and editing of presentations in a simple way, collaborating with other people from anywhere with an internet connection.
- Google Gmail. Allows you to receive and send messages; likewise, information can be shared.
- Google Form. It allows the creation and evaluation of questionnaires on a particular topic. The resolution of the questions is immediate; in addition, it allows to see the partial results; produces graphs of each question, which can be downloaded into an Excel spreadsheet.

Phase three

The subject site and the integration of Google resources were put into practice. Throughout the August-December 2019 semester, there was the participation and collaboration of the students (see figure 3).

Figura 3. Integración de los recursos de Google



Fuente: Elaboración propia

Phase four

Performance was assessed using the Santoveña instrument (2010). For this, the Google Forms tool, located in Google Drive, was used and shared with the students so that they could carry out their evaluation.

Results

This section presents the results found once the project was successfully implemented. Thus, the ages of the students were the following: 88.88% are between 17 and 19 years old; 7.4% between 20 and 23 years old, and 3.7% between 24 and 26 years old. These figures are also observed in table 1.

Tabla 1. Edad de los estudiantes encuestados

Edad	Total de alumnos	% de edad
17-19 años	24	88.88 %
20-23 años	2	7.40 %
24-26 años	1	3.70 %

Fuente: Elaboración propia

As can be seen, the range between 20 and 23 obtained a higher percentage in the study sample. Regarding gender, the results indicate that, taking into account the total of the unified sample, the male participants make up the figure of 44.45% and those of the female sex that of 55.55%, as observed in table 2.

Tabla 2. Género de los estudiantes encuestados

Género	Total de alumnos	% de género
Femenino	15	55.55 %
Masculino	12	44.45 %

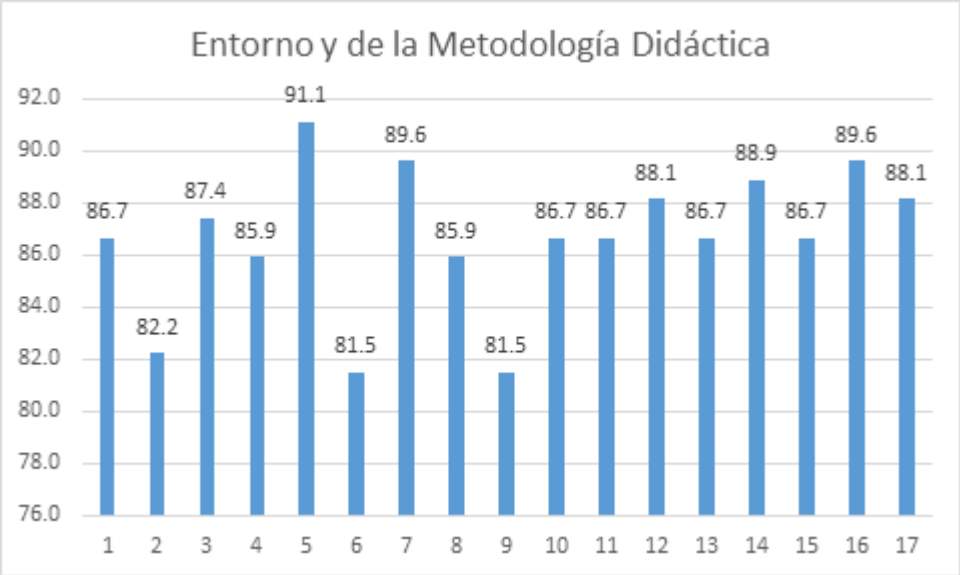
Fuente: Elaboración propia

As can be seen, the female gender had a higher percentage in the number of students, which made up the subject selected for the study.

Evaluación del curso virtual

Figure 4 represents the results of the first factor of the instrument to evaluate the virtual course. It can be seen that the 17 questions obtained a percentage greater than 80%. Following the results of item five, thanks to the resources used in the development stage of Google, it was possible to obtain a diversification of tools for the matter. The general average of the first factor was 86.7%, which supports that the virtual course meets the relative aspects of quality and quantity of didactic content.

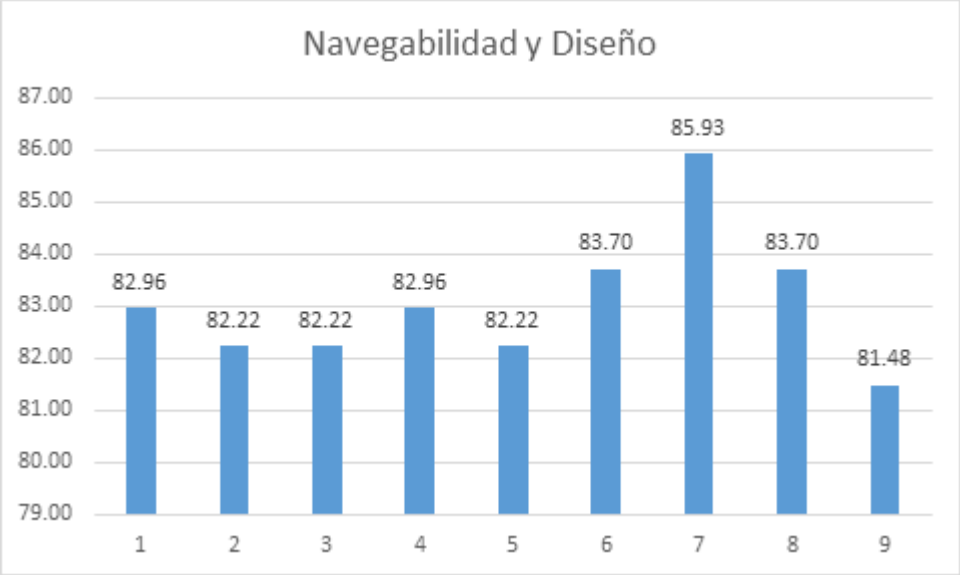
Figura 4. Evaluación del entorno y de la metodología didáctica



Fuente: Elaboración propia

Figure 5 represents the results of the second factor of the survey to evaluate the virtual course. It can be seen that the nine questions obtained a percentage greater than 80%. It is noteworthy what was obtained in question seven. According to the results of this, adapting Google tools, it was possible to obtain a coherent design of the virtual course. The general average of the second factor was 83.0%, which shows that the virtual course fulfilled in offering didactic aspects in a complete and rich way.

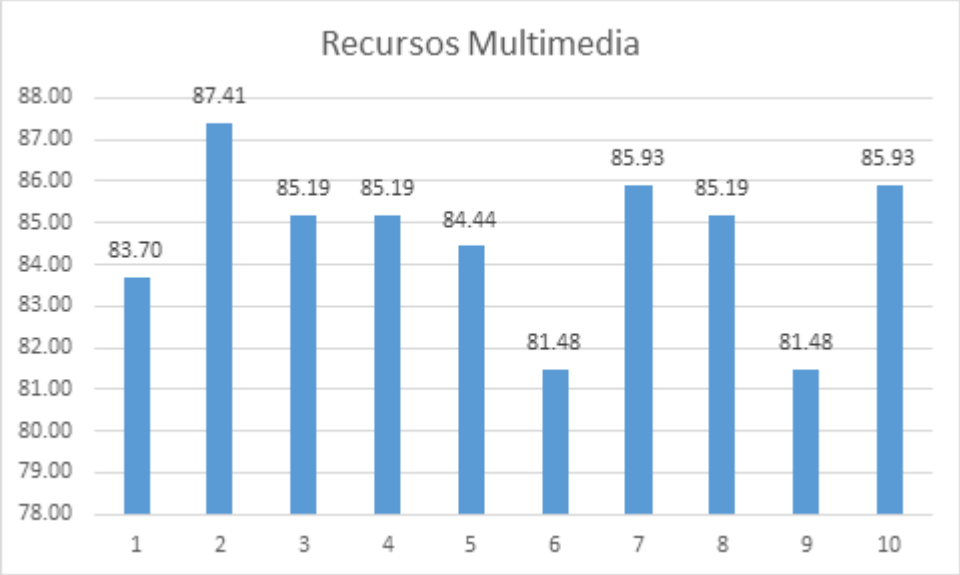
Figura 5. Evaluación de la navegabilidad y diseño



Fuente: Elaboración propia

Figure 6 represents the results of the third factor of the survey to evaluate the virtual course. It can be seen that the 10 questions obtained a percentage greater than 80%. What was obtained in question two stands out, since, adapting Google resources, it was possible to obtain a virtual course that offered interactivity among students. The general average of the second factor was 84.6%, which, in turn, shows that the virtual course fulfilled in offering functionality and navigability among the students.

Figura 6. Evaluación de los recursos multimedia.



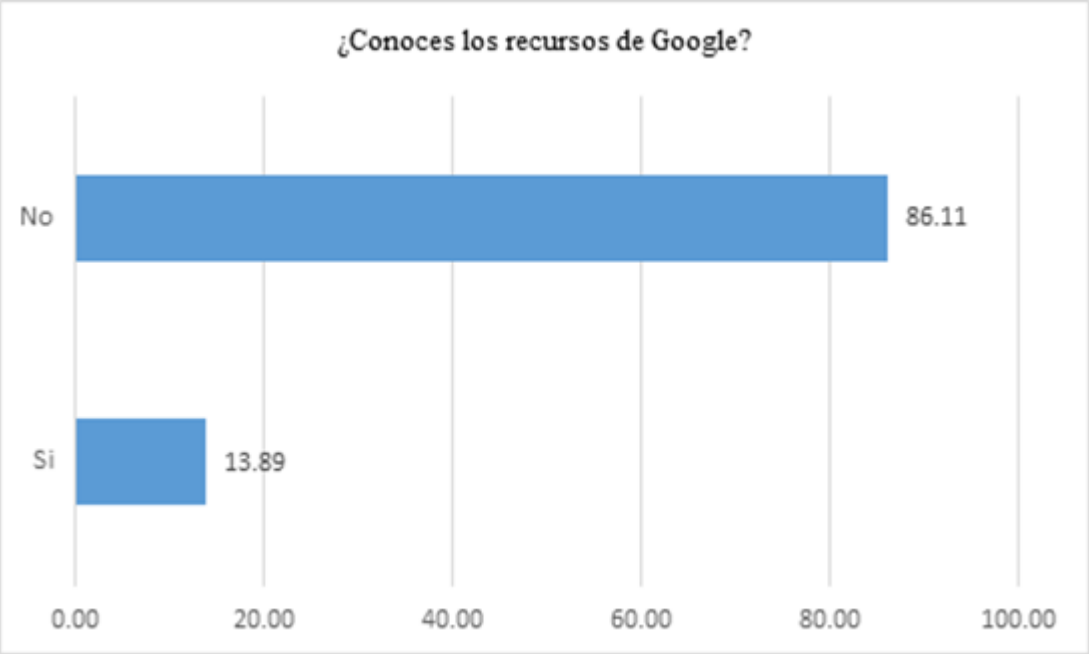
Fuente: Elaboración propia.

The general average of student perception about the evaluation of the virtual course was 84.6%, which shows that an acceptable result was obtained among the student community.

Google aspects

Finally, within the questions that were adapted to the instrument, the result of the question about the knowledge that the students had about Google resources is shown, figure 7 represents the results of the knowledge of Google tools by the students. students.

Figura 7. Resultados del conocimiento de los recursos de Google



Fuente: Elaboración propia.

It can be seen in the previous figure that a high percentage of students had no knowledge of Google resources. Thus, it was quite a challenge, a test that was passed, to demonstrate to the students the advantages of integrating these tools in the field of education.

The evaluation of satisfaction of the resources by the students is shown in figure 8. As can be seen, the most voted resources were: Forms and Tasks. The first was used to formulate, share and solve the unit tests. The second was used to send and integrate the tasks that made up each of the units of the subject. Figure 8 represents the results obtained by each tool used in the subject.

Figura 8. Evaluación de satisfacción de los recursos de Google.

Fuente: Elaboración propia

Discussion

Once this project was launched, information was obtained on how students use technological tools and how to design academic activities with their help, which can be developed individually or collaboratively.

An important piece of information was obtained regarding whether the students of the subject under study knew the Google resources before using them in class: 86.11% indicated that they did not know it, data that coincides with the results of the research carried out by researchers Delgado and Casado (2013), who found that 74.6% of enrolled students declared not knowing these resources, specifically Google Drive. Another remarkable finding is the one thrown in the evaluation of the resources by the students, since Google Sites was one of the most voted; This coincides with what was obtained by Tolosa and García (2011) and Galantini (2015). In addition, the Google Drive (Tasks) resource obtained a very high weighting, which coincides with the results obtained in Quinatoa (2015), Gil, Sánchez, Segura and García (2016). Also, the present study yielded a high degree of recommendation by the participants, a result that coincides with other studies (Delgado and Casado, 2013; Ruiz and Dávila, 2014). Another discovery to highlight is the benefit of Google resources in the teaching-learning process, which also coincides with other studies (Barrios, 2017; Castellanos and Martínez, 2013; Huzco and Romero, 2018; Zambrano, 2015). Finally, the

integration of Google tools as educational support coincides with the works of Garay (2012), Roda and Sassano (2016), Cabanillas and Cano (2017), Ventayen and Orlanda (2018), Kakoulli (2018) and Aparicio Arteaga (2019), all of which had positive results.

Conclusions

The resources offered by Google for education are very useful, as they help students to develop skills based on the use of ICT. This development allows us to be at the forefront not only in education, but also to meet the demands of the current labor market. On the other hand, an important feature of Google tools is that they are free and available online. In addition, these resources can be adapted to the different educational needs that teachers may present.

In addition to this, a notorious benefit of using Google tools is optimization over time, since they facilitate many student activities. On the other hand, implementing Google resources in education favors the creation of collaborative spaces, which will positively impact the teaching-learning process. As if that were not enough, the manipulation of many of these tools does not require deep computer or programming knowledge.

The benefit that Google resources offer in education is proven, there is research to support it. The important thing will be to have a good synergy between the various actors that are involved in the teaching-learning process. In the present study, the Google resources implemented in a subject with higher education students were evaluated. The results showed high levels of acceptance of the use of the tools. Each of them obtained a recommendation above 80%. And the average rating was 84.6%. With the integration of Google resources in the subject it was possible to put into practice accessible tools for the students, which, in the first instance, they did not know, but as the school year progressed they learned them and, in the end, they ended up accepting them, in its vast majority. In short, a more than satisfactory result was obtained in the acceptance and recommendation of Google tools.

It is recommended to carry out a study where all the educational resources of Google are integrated in order to take advantage of the range and potential of all the tools that are offered. Also, training is suggested for all parties involved in the educational process in order to further deepen the knowledge and application of G-Suite in the teaching-learning process.

Future lines of research

The present study managed to know the student perception of the evaluation of a university course by integrating Google resources as educational support, where a very specific context was used, the subject of production management II.

A first line of research will be to extend the research to all other subjects throughout the sixth semester, at first. In a second moment, extend the study to the entire engineering career in Business Management. For a third moment, increase the investigation of all the plans and study programs that the Milpa Alta Technological Institute offers to the student community. Once the above is done, the evolution in each of the engineering departments that the aforementioned university offers can be analyzed. In addition, you can learn from those that successfully apply Google resources as educational support both qualitatively and quantitatively.

Another line of research will be to focus on teachers, to find out if they are trained to use Google resources, what competencies need to be strengthened on this topic; in addition, to know if they promote the use of ICT and Google resources through activities that allow students to enhance their learning.

One more option will be to apply the surveys with students from other educational institutions of higher education in order to know, through a comparative study between universities, the degree (greater or lesser) of use of ICT and Google resources as educational support . Also, learn about the strategies of the institutions that have successfully applied this toolkit in the educational process.

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