Designing an English learning website by using the ADDIE model

Diseño de un sitio web de aprendizaje de inglés mediante el modelo ADDIE

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Keywords
Website design; ADDIE model; English learning; CMS; LMS

ABSTRACT

This paper describes the design of a website for the teaching and learning of English at Universidad del Cauca, Colombia, according to the ADDIE instructional design model to provide academic alternatives with the support of web-based technologies. The prototype of a website capable of hosting English courses managed through virtual or blended modality is the concrete result of this study. Although the low number of courses hosted and oriented on the website may be a limitation, the information collected allowed the tool sophistication throughout the process. This study contributed to apply the ADDIE model for designing a web tool to manage English courses at Universidad del Cauca.

Palabras clave
Diseño de sitio web; modelo ADDIE; aprendizaje de inglés; CMS; LMS

RESUMEN

En este trabajo se describe el diseño de un sitio web para la enseñanza-aprendizaje de inglés en la Universidad del Cauca, Colombia, de acuerdo con el modelo de diseño de instrucción ADDIE para ofrecer alternativas académicas con apoyo de tecnologías basadas en la web. En cuanto a los resultados obtenidos, se presenta un prototipo de sitio web capaz de hospedar cursos de inglés gestionados mediante la modalidad virtual o mixta. Aunque el número relativamente bajo de cursos que se han alojado y orientado hasta el momento en la página puede ser una limitación, se recolectó información valiosa que permitió la sofisticación de la herramienta a lo largo del proceso. Este trabajo aportó en la aplicación del modelo ADDIE para el diseño de una herramienta web para la gestión de cursos de inglés en el contexto institucional de la Universidad del Cauca.

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INTRODUCTION

Universities and higher education institutions around the world are increasingly using web technologies in the language teaching-learning process, often through Content Management Systems (CMS) and Learning Management Systems (LMS) that allow the integration of resources and tools for users of managed courses. Several studies report the benefits of subjects supported by CMS and LMS, for example in English achievement, thanks to Moodle-based virtual environments with student-centered approaches (Jeong, 2017) and their performance in grammar (Fathi & Torabi, 2019); writing development through the iELLS (Integrated English Language Literacy System) platform (Hamat, Azman, Noor, Bakar, & Nor, 2014); language learning skills on the Blackboard and Oxford iQ Online platforms (Al-Mubireek, 2018); self-directed learning in flipped classrooms and its impact on language skills through the TES BlendSpace platform (Zainuddin and Perera 2018); language teacher training through platforms such as Moodle, Blackboard, and Rcampus (Omar and Yaacob, 2020), and leveraging in language learning and promoting autonomous learning through the SAKAI LMS in a blended learning model (Ahn, 2017).

Also, a widespread discussion is the need to use instructional models that support the design, implementation, and evaluation of web tools applied to effective language learning, and to plan the use of these technologies in language teaching-learning (Parmaxi and Zaphiris, 2016; Ghani and Daud, 2018; Yanguas, 2018; Yeh and Tseng, 2019). Consequently, some studies suggest developing web tools and resources according to instructional design models to achieve quality materials, starting from learning needs, in a specific context with well-defined learning objectives. In this sense, the ADDIE model (analysis, design, development, implementation, and evaluation) is one of the most effective instructional design schemes in the systematic development of web tools for learning (Wright, 2018).

Some studies use the ADDIE model for creating websites using CMS and LMS, in addition to different applications to obtain effective and efficient prototypes that positively impact language learners' academic improvement (Ghani and Daud, 2018; Al-Jahwari and Abusham, 2019), monitoring and feedback (Coto, 2015), and effective teaching of language skills (Türker, 2016; Manan and Rahmat, 2020). Another work explores the design of web tools for language learning according to learners' needs Yuangngoen *et al.*, 2019) and the use of web technologies, based on a theoretical framework that promotes the management of technologies in learning (Almelhi, 2021).

The ADDIE model allows the design of effective online learning tools based on the learning needs and context in order to define the contents and their organization, objectives, goals and learning assessment. In this study, the ADDIE model was used as an academic alternative mediated by web

technologies, in accordance with Branch (2009) and the steps of language course design proposed by Graves (2000): needs assessment, context definition, content conceptualization, articulation of beliefs, formulation of goals and objectives, content organization, development of materials and design of an evaluation plan (see Table 1).

Table 1. Correspondence between the ADDIE phases and the language course design stages

ADDIE phases	Design stages of language courses
Analysis	Needs assessment Context definition Formulation of goals and objectives
Design	Content conceptualization Content organization Articulation of beliefs Design of an evaluation plan
Developing	Material development
Implementation and evaluation	

Source: self made based on Branch (2009) and Graves (2000).

Initially, the website was conceived as an electronic environment to support English learning through a blended model; however, since 2020, and due to the emergency caused by covid-19, it has served as a platform for the administration of virtual courses with synchronous classes and autonomous student work days.

The project described here presents the process of design, implementation and evaluation of a web site (https://www.virtualpfi.space) to contribute to the training of students at the Universidad del Cauca (Colombia) in preparation courses for state tests, general English as a degree requirement and English for specific purposes.

This study seeks to provide answers to questions such as: can the ADDIE model support the design of a web tool to manage the teaching-learning of English; how to structure the website in a way that responds to the English learning needs of students at the Universidad del Cauca; what are the tools and technological resources necessary for the creation of the website; and how will the website be evaluated so that the results are applicable to its continuous improvement?

To answer these questions, the main objective was to design a prototype website using the ADDIE model for English language training with the

support of web technologies. The following specific objectives were proposed:

- Establish an action plan according to the needs analysis.
- Choose the software applications necessary for the management of the English courses
- Structuring the website with its various components
- Upload and organize the materials and contents of the courses
- Implement the courses with the support of the website and its components
- Evaluate the results of the implementation
- Make the necessary adjustments for future implementations of the website.

METHODOLOGY

The ADDIE model was used because it is a process that serves as an appropriate guiding framework for the development of educational products and other effective learning resources (Branch, 2009). The population of this study was 900 English students of the Language Training Program (PFI) of the Universidad del Cauca, from which a sample of 100 students was formed, selected by means of non-probabilistic convenience sampling, to participate in the phases of analysis, implementation and evaluation of the tool.

The analysis stage was supported by a survey that examined the needs of students from different academic programs of the Universidad del Cauca formally enrolled in the English courses offered by the PFI; this was applied in the month of February 2019 and covered the students' familiarity with the computer and internet, computer skills, as well as the needs and expectations they have about the convenience of a website for the management of the English courses of this educational institution.

According to the data obtained from this instrument, a description of the problem was made, which consists of the need to provide a learning environment that allows hosting and managing web-based English courses in a blended and virtual mode.

Based on the information collected during the analysis, the organization and conceptualization of the content, the articulation of beliefs and the design of the evaluation plan were carried out.

In the development phase, four interrelated tasks were carried out: 1) contracting the BlueHost web hosting service for the site; this company was chosen after consulting the best private virtual servers selected by Find Best Hosts (2019), with respect to quality, price, security and functionality of the support tools for website design. 2) Selection of the WordPress CMS based on CMS considerations for higher education (2010), concerning identification of primary users (faculty, students, and web content administrators), goals (costs and ease of implementation and administration), and web content (type of information and organization of information). 3) Selection of a WordPress-based LMS by administering a 31-item Likert scale to compare the basic features and tools of two LMSs (interactivity, flexibility, scalability, standardization, usability, functionality, ubiquity, and accessibility), following the analysis of Clarenc, Castro, Lopez, Moreno, and Tosco (2013). 4) Selection of applications for the extension of functionalities of the chosen LMS (see figure).

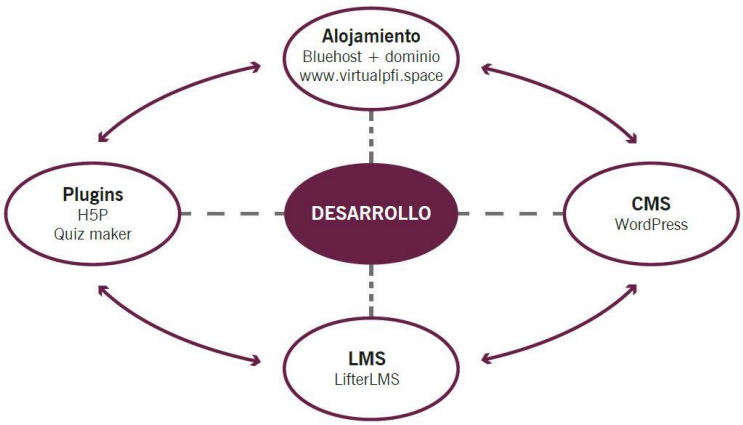


Figure. Software required in the development phase

In the implementation stage, the English courses were oriented with the support of the website designed in accordance with the requirements of the faculties to the IPP (see Table 2). Finally, for the evaluation phase, a final survey was administered to 50 users who participated in the courses to collect their general impressions about the work on the website, the work and communication tools, as well as the strengths and weaknesses of the page.

Table 2. Courses managed through the website

Course	Modality	Period	No. of students
Preparation for the English module of the Higher Education Quality Examination in Colombia (Saber Pro)	Mixed (50% in person and 50% online)	September and October 2019	30
English with an emphasis on speaking ability	Fully online (70% synchronous and 30% asynchronous)	May and June 2020	8
English A1		September and December 2020	20
General English (B2)		November 2020	12
English A2		February 2021	74
Reading comprehension in English (B1)		June 2021	25

RESULTS

The results of the project are presented according to the administration of the instruments and the actions implemented in the ADDIE model (see Table 3).

Table 3. Organization of the presentation of results

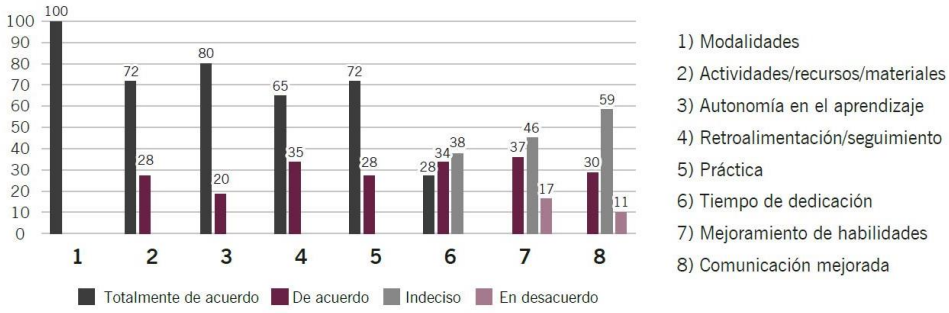
ADDIE phases	Instruments for collecting information		
Analysis and design	Diagnostic survey	Survey subjects	100 students
		Collected information	Computer skills and use of the internet, needs and expectations of a website to manage English courses and suggestions for its design
		Data processing	SPSS 26
Developing	Likert scale	Participants	16 English teachers
		Collected information	Comparison of two LMS

ADDIE phases	Instruments for collecting information		
		Data processing	SPSS 26
Implementation and evaluation	Final survey	Survey subjects	50 users of the courses taken on the website
		Collected information	General impressions of the website and the courses, strengths and weaknesses of the website and its tools, communication tools, promotion of autonomy/collaboration, and monitoring of learning
		Data processing	Quiz maker (online survey) SPSS 26

In the analysis phase, the problem faced by the project (the lack of a virtual environment to conduct English courses with the support of web-based technologies) was identified, and subsequently the diagnostic survey was administered to students from different academic programs registered in the IPP English courses. Among the results obtained, it is relevant that all the students consider that a website would be a useful tool for learning English, that they have computers and Internet connection both at home and at the faculties.

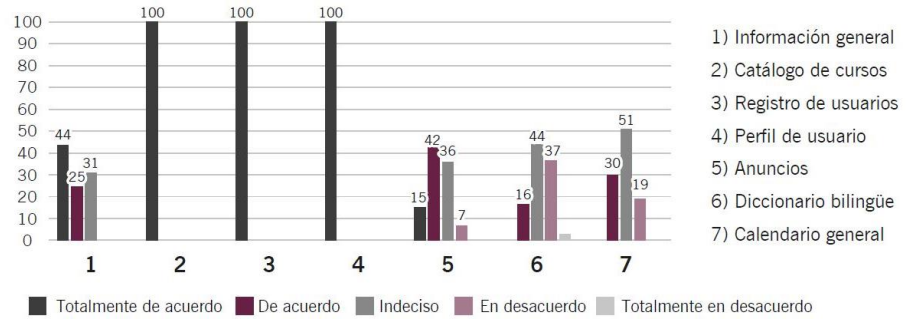
The total of the respondents believe that the website will allow them to have English courses in different learning modalities. This is reflected in the fact that the most representative percentages for the items lean towards the "strongly agree" response option.

Of the respondents 72% believe that the website will facilitate the availability of activities, resources and materials; 80% believe that it will be useful for autonomous learning; 65% believe that it will provide greater opportunities for feedback and follow-up; and 72% believe that it will provide more opportunities for practice. That the website can contribute to more time spent studying English, improvement of language skills, and better communication among course users were the items on which respondents were most hesitant, with 38%, 46%, and 59%, respectively (see Graph 1).



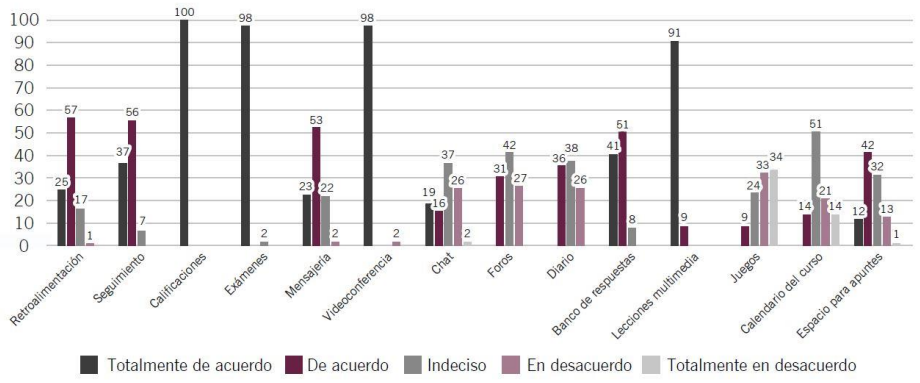
Graph 1. Students' reasons for the usefulness of the Web site.

Regarding the content that the website should provide, all of the respondents considered that it should provide a course catalog, registration (login/logout) and user profile information. Similarly, 44% of respondents strongly agreed that the site should have a home page that provides general information about the courses and services offered by the IFP, and 15% suggested that it should display important announcements. Overall, there was more hesitation about the website providing general information (31%), announcements (36%), a bilingual dictionary (44%) and a calendar (51%) (see Graph 2).



Graph 2. Contents that the website should provide according to the students.

Regarding LMS resources and tools, the entire sample fully agreed with grading tools; 98% with video conferencing and online tests; 91% with multimedia lessons; 41% with an answer bank of online activities; 37% with tracking tools; 35% with feedback resources; 23% with a messaging service; 19% with a chat interface; and 12% with a space for taking notes. The highest percentages of hesitation were found in the items that included tools such as a course calendar (51%), forums (42%), journals (38%) and chat service (37%) (see Graph 3).



Graph 3. LMS tools and resources.

In the development phase, LearnDash 3.0 and LifterLMS 3.27.0 were compared by administering a Likert scale, with the same items and justification options, to 16 teachers, who evaluated both systems according to the basic features and tools of an LMS. Upon analyzing the information, it was found that all respondents strongly agreed that the two LMS platforms provide opportunities for two-way communication through notifications, multimedia lessons, voice recognition and various communication tools. It was also agreed that they fulfill the expected function; have the capacity to host a large number of students without losing their quality; support the extension of functionalities; offer various design and content organization options; allow access on various types of devices and browsers; and facilitate access to information and materials, at any given time from anywhere; they enable users to carry out activities on the platform quickly and easily; they allow the management and registration of users with different roles and capacities; they allow the creation of various types of courses and the management of certificates; they facilitate the monitoring of students' work and offer feedback and evaluation tools.

The differences between the two systems evaluated lie in their adaptability to possible changes in curricula and content, in the speed and ease of navigation and access to the system they offer and, finally, in their variety of tools for designing tests (see Table 4).

Table 4. Items with the greatest differences for each LMS item

LMS	Item	Totally agree	Agree	Undecided	Disagree
LearnDash	Adaptable to plans and contents	50%	31.3%	18.7%	-
LifterLMS		75%	25%	-	-

LMS	Item	Totally agree	Agree	Undecided	Disagree
LearnDash	Speed/ease in navigation and access	18.8%	68.8%	-	12.4%
LifterLMS		62.5%	37.5%	-	-
LearnDash	Varied exam design	87.5%	12.5%	-	-
LifterLMS		37.5%	50%	12.5%	-

In the implementation phase, English courses were conducted in the mixed mode, one of these was Preparation for the English Module of the Higher Education Quality Examination in Colombia (Saber Pro), which took place between September and October 2019, with a capacity for 30 students who were to take this test in mid-October of the same year. The virtual mode was divided into 70% synchronous classes and 30% website work in the following courses: English with emphasis on speaking skills -between May and June 2020-, for eight Systems Engineering students who required preparation in spoken English for the presentation of technological innovations abroad; General English (B2) -November 2020-, for twelve students of the PhD program in Mathematics; General English (A1) -September and December 2020-, for 20 students from the Social Communication program; Reading Comprehension in English (B1) -June 2021-, for 25 students from the Master's in Education program; and four General English (A2) courses -initiated in February 2021-, for 74 students from different academic programs.

To evaluate the implementation, a final survey was administered to 50 users of the courses (25 students of each mode); this was applied through Quiz Maker, which allows the collection of information online. The results are presented in general and differentiated for the mixed mode and the virtual mode.

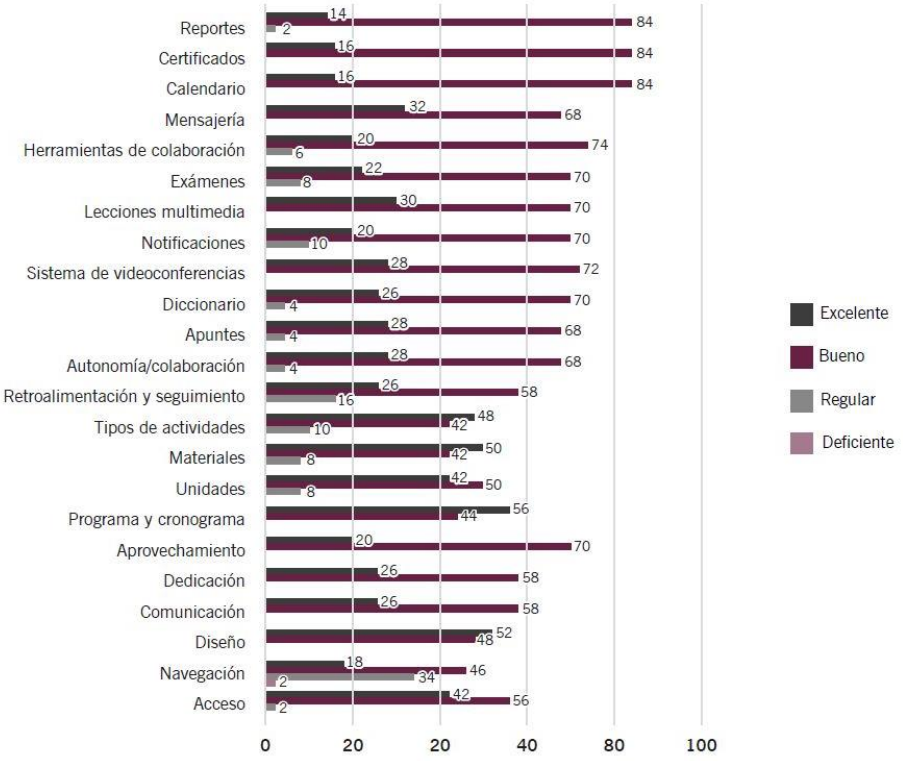
In the items of general impressions of the website, 42% rated access to the system and courses as excellent, 56% as good and 2% as fair. Navigation was rated as excellent by 18%, good by 46%, fair by 34% and poor by 2%. As for the site design, 52% considered it excellent and 48% good.

Within the axis of the strengths and weaknesses of the web site and its tools, the items related to the course were integrated; of these, 56% of the users surveyed rated the course program and schedule as excellent and 44% as good. The course units (modules, lessons and activities) were rated by 42% as excellent, 50% as good and 8% as fair. The course materials were considered excellent by 50%, good by 42% and fair by 8%.

In the activity items, 48% rated the types of activities as excellent, 42% as good and 16% as fair. Feedback and follow-up were evaluated by 26% as excellent, by 58% as good and 14.1% as fair. Meanwhile, 28% rated the

promotion of autonomy and collaboration as excellent, 68% as good and 4% as regular.

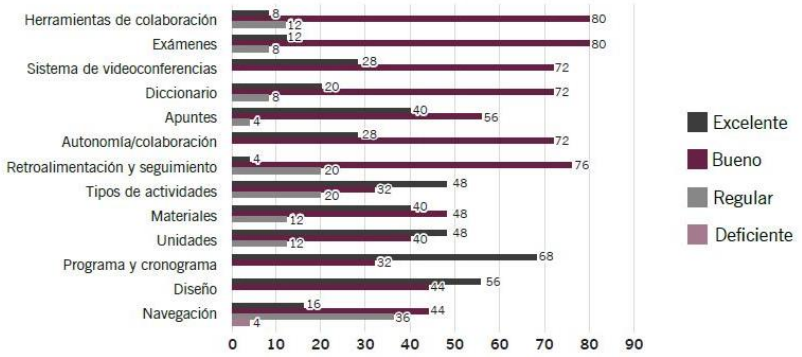
With respect to work and communication tools, the space for notes was considered excellent by 28%, good by 68% and fair by 4%. The dictionary was rated by 26% as excellent, 70% as good and 4% as fair. The videoconferencing system was rated by 28% as excellent and by 72% as good. Notifications were considered by 20% as excellent, by 70% as good and by 10% as fair. Multimedia lessons were rated excellent by 30% and good by 70%. Tests were rated as excellent by 22%, good by 70% and fair by 8%. Collaboration tools (chats, wikis, forums, blogs) were considered excellent by 20%, good by 74% and fair by 6%. Messaging was rated as excellent by 32% and good by 68%. Calendar tools and certifications were rated 16% as excellent and 84% as good. Finally, 14% rated the reports and statistics as excellent, 84% as good and 2% as fair (see Graph 4).



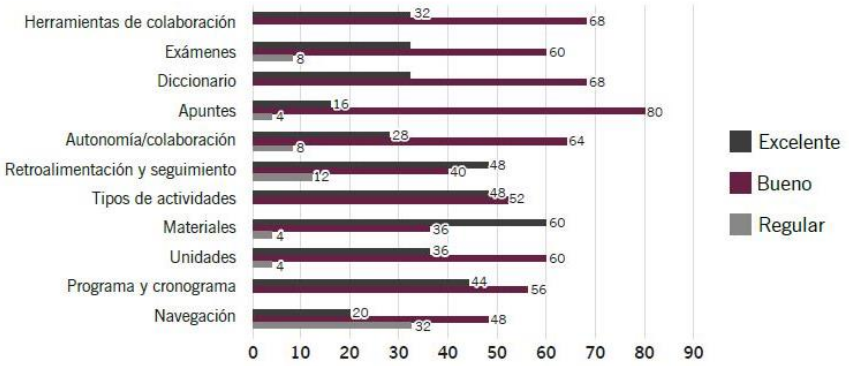
Graph 4. Final user survey responses.

When comparing the differentiated data for each mode, the results were identical for the messaging tool and the videoconferencing system in both modalities (mixed and virtual), while the rest of the results were particularly unequal, especially for the collaboration tools (chats, wikis, forums and blogs), wikis, forums and blogs), tests, dictionary, space for

notes, promotion of autonomy and collaboration, feedback and follow-up, types of activities, materials, units and program, as well as schedule and navigation (see Graph 5 and 6)



Graph 5. Responses to the final survey of mixed modality users.



Graph 6. Responses to the final survey to users of the virtual modality.

Specifically, in the learning activities for the blended mode, two simulations of the English module of the Colombian Higher Education State Test Saber Pro were used, favoring face-to-face sessions for the presentation of these tests and online activities, which included questions similar to those appearing in that module; in addition, feedback and online follow-up sessions were carried out both synchronously and asynchronously on the platform. For both virtual and blended modalities, synchronous and asynchronous learning activities were conducted using the Quiz Maker application, LifterLMS quizzes and interactive activities on the platform using H5P for paragraph writing, quizzes, vocabulary games, audio recording and listening activities, lesson presentations, dialogue cards, dictations, interactive books and paragraph organization following the needs of each course.

DISCUSSION

In the diagnostic survey, all the students reported having computers and Internet connection, their perception is good about having a website for English teaching-learning and they totally agree that this tool will facilitate the initiation of training processes in different learning modalities, meeting the requirements of the institution and the needs of the users. These aspects were proven in the implementation phase of the study, since one course was managed in the blended mode in 2019 and eight courses in virtual mode with 70% synchronous work and 30% work on the website created.

Other reasons for the importance of having the website were shown in the high percentages obtained for items related to greater access to activities, resources and materials, promotion of autonomous and collaborative learning, and greater opportunities for practice, feedback and follow-up of learning. In this regard, the responses in the final survey coincide with the expectations provided by the students in the diagnostic survey: the majority of participants rated positively the availability and access to activities, resources and materials (excellent 50% and good 42%); the promotion of autonomous and collaborative learning (excellent 28% and good 68%); and the opportunities for practice, feedback and follow-up of learning on the website (excellent 26% and good 58%).

These results are consistent with the findings of studies reporting that virtual learning environments facilitate greater access to resources, materials, and activities compared to what occurs in the traditional face-to-face classroom (Ghani & Daud, 2018), while enhancing students' autonomous, collaborative, and active work (Al-Jahwari & Abusham, 2019) and providing greater opportunities for practice toward learning goals and objectives, feedback, and follow-up through web applications (Almelhi, 2021).

Percentages of hesitancy were present in the diagnostic survey on the perceived usefulness of implementing a website in terms of time commitment, improvement of language skills, and improved communication among users, which is due, according to the rationale for this item, to the fact that students perceive time commitment and improvement of language skills as more dependent on motivation for learning English than on the tool to be implemented. However, in the final survey responses, the improvement of their language skills, and the increase in time spent on language study and communication, reinforced by working on the website, were almost entirely rated as excellent (20%) and good (70%) (excellent 26% and good 58%). These data are consistent with studies that evaluated the effectiveness of the website as a support for students to learn the target language (Ghani and Daud, 2018; Al-Jahwari and Abusham, 2019; Almelhi, 2021).

Students' suggestions in the diagnostic survey regarding the design of the website interface were considered to respond to the characteristics of identification (general information about the institution and its services), navigation (navigation bars, menus, and buttons), content (structured information), and interaction and accessibility (allows the user to meet his or her objectives). These essential components of the interface on the landing page took the form of a main menu of general information, a course catalog, user access/registration and the user profile. This information is consistent with the usability criteria for educational websites presented by Clarenc *et al.* (2013) concerning system access, course descriptions, user profile information and the academic calendar (see image).

Image. Web site interface.

In the results of the diagnostic survey, students showed a preference for LMS tools for managing tests and grades, for an integrated videoconferencing system and multimedia lessons, and to a lesser degree for messaging, chat, forums, journal, answer bank and note space. Therefore, in the development phase, a comparison between LearnDash and LifterLMS was made and it was concluded that LifterLMS met user expectations better.

LearnDash and LifterLMS are both WordPress-based systems, similar in terms of their basic tools and functionalities. LifterLMS has a slight advantage in having a free basic core available, greater adaptability to possible changes in curricula and content, as well as faster loading speed and better navigation; however, the disadvantage it has over LearnDash is in the variety of tools for test design.

As for the ratings derived from the final survey, just over half of the users rated the navigation on the website and LifterLMS as excellent (18%) and good (46%), while a significant group rated it as fair (34%) and only a few poor (2%), this was due to occasional network crashes or system slowdowns. The disadvantage regarding the variety of tools for designing tests was notable in the implementation of the courses in LifterLMS, an

aspect that was solved by using Quiz Maker, which was positively evaluated by the users (excellent 22% and good 70%).

The results of the different learning modalities had points of convergence and divergence. Students in both modalities rated as good and excellent the website tools (calendar, messaging and certificates), the multimedia lessons, the videoconference system, the program, the schedule and the website design. The main differences were in the tools (wikis, blogs, forums, reports, notifications, dictionary and space for notes), tests, promotion of autonomy and collaboration, feedback and follow-up, type of activities, materials, units, navigation and access. Among these, the type of activities, feedback and follow-up stand out, since the course carried out in the mixed mode was preparation for the English module of the Saber Pro state test, where simulations were conducted in the face-to-face sessions, and both feedback and follow-up were mainly online, synchronous and asynchronous, and on the platform.

Since LiferLMS does not have its own videoconferencing system in its basic core, Google Meet (integrated into the platform) was used for synchronous work with students; this was rated by all users surveyed as excellent (28%) and good (72%), similar to what happened with multimedia lessons (excellent 30% and good 70%), messaging tools (excellent 32% and good 68%), and collaboration through chats, wikis, forums and blogs (excellent 20% and good 74%).

These results are consistent with the findings of certain studies that inquire into the need and benefits of having LMS tools for teaching a language (Almelhi, 2021; Coto, 2015), for grading and test administration (Manan and Rahmat, 2020), for pronunciation and feedback (Al-Jahwari and Abusham, 2019), for learning monitoring and the advantages of a communication system and video conferencing (Coto, 2015; Yuangngoen *et al.*, 2019) and multimedia lessons (Ghani and Daud, 2018; Manan and Rahmat, 2020).

With all the above in consideration, this project contributes to the development of websites for English teaching-learning following the stages of the ADDIE model and the stages of Graves' (2000) language course design, with the aim of providing a virtual environment from the users' needs, contemplating the context, adaptation and creation of learning materials, learning goals and objectives, conceptualization and organization of content and assessment.

The main limitations of this study are related to the collection of information, from the learner's point of view and from a relatively small number of the users who participated in the courses since the end of 2019. Therefore, it is necessary to give continuity to the work that consolidates the use and allows the robustness and sophistication of the website designed for the Universidad del Cauca.

CONCLUSIONS

The theoretical-practical contribution of this study is found in the use of the phases of the ADDIE model in the design of a web site and its respective components for the teaching-learning of English in the context of the Universidad del Cauca, in Colombia. According to the results, the ADDIE model provided an effective guide for the design of the web tool. As a concrete result, the prototype of the site (https://www.virtualpfi.space) was obtained, a tool coherent with the stages of the design of language courses in technology-supported learning modalities. Within the situation of the pandemic caused by Covid-19, the site has been of great importance in English language training totally online.

Consistent with the need for a technological resource to manage English courses in modalities other than face-to-face, the website created was structured taking into account the phases of the design of language courses, starting from the needs and learning environment of the students of the Universidad del Cauca. The website incorporated a set of technological tools and resources for English language learning through the combination of Bluehost, a powerful, economical and flexible web hosting system; WordPress, a user-friendly open source system for web content management; and LifterLMS, a web content management system; and LifterLMS, a learning management system with a free, intuitive and expandable core for managing content, materials and activities through applications that promote interactivity (H5P), test management and grading (Quiz Maker), communications (chat, wiki, forums and messaging), synchronous (Google Meet) and asynchronous work through lessons and multimedia activities available on the platform.

The evaluation of the website was carried out by means of a survey that allowed collecting information regarding the convenience of the design, contents and materials, activities and technological tools, as well as the pedagogical conception for a future sophistication of the created resource.

To give continuity to this work, it is necessary to plan implementation and evaluation studies of the website and its components through projects that analyze aspects such as motivation, impact on teaching and learning, practice of language skills and users' perceptions, as part of future courses managed with the support of this resource.

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