

Innovate Experience of Digital Resources to Promote Autonomous Learning

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Abstract

The advance of ICT has had an impact on the educational sphere, given that websites, educational platforms, and digital resources are now being used to enable students to learn actively. This article details the experience of the educational proposal La Mochila de Koeko (Koeko's Backpack), which contains digital resources to promote autonomous learning strategies. In addition, qualitative information is collected through surveys and interviews with primary school teachers who have used digital resources during the pilot application. Among the main results, teachers highlight that the video was the most valued resource, and oral expression was highlighted among the strategies. The link between the use of digital resources and student motivation was also recognized.

Keywords

digital resources, autonomous learning, educational video, educational website, primary education.

1. Introduction

Nowadays it is increasingly common for school children to access information through internet videos and interact with various technologies. Over time, schools have begun to promote technology integration in the teaching and learning processes in face-to-face education and even more so in distance education. According to Sunkel and Trucco [1], progress has been made in the incorporation of ICTs in the education systems of Latin American countries, especially in terms of infrastructure and the degree of Internet connectivity in schools to verify these advances. Their study reveals a relationship between the use of technologies and the performance of secondary school students in the area of science, in this case in Uruguay, Colombia, and Chile.

For their part, Area, Cepeda, and Feliciano [2] point out that current primary school students belong to a generation that is mainly characterized by the influence of communication formats and the exchange of audiovisual information through videos, audio, icons, texts, etc. Therefore, it is not only necessary to focus on learning by reception, but also on interaction with virtual media where students become active subjects who reconstruct and give meaning to information, through technological experience or not, and reflective action, which will allow them to develop competencies for the future [3].

Due to the situation caused by the health crisis, some countries opted for distance education and the use of technology. However, it is worth noting that according to the World Bank, the health crisis is the biggest shock in the history of the education sector in Latin America and the Caribbean, given that the closure of schools has affected nearly 170 million students [4]. Added to this is the difficulty of achieving adequate levels of effective participation and quality, despite the policies deployed in each of these countries. It is worth noting that in Peru, the multi-channel strategy "Aprendo en Casa" (I learn at home) was established, allowing children to continue their classes through radio, television, and

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internet resources. In addition, guidelines were established to ensure the continuity of education from a distance modality; however, quality and equity in education have not been achieved during this process.

For this reason, various educational institutions and collectives developed alternative proposals to generate educational content and contribute to reducing the gap generated by the interruption or lack of access to the education system. The proposal called "La Mochila de Koeko" contains a series of digital resources that aim to promote student autonomy through the development of self-study strategies. To this end, it proposes a learning route that includes short videos where the main character, Koeko, models the strategies and self-instructional materials to develop practical exercises, which can be downloaded from the project's website or shared by other means, depending on the users' possibilities.

2. Digital Resources

2.1. Websites for educational purposes

Marqués defines educational websites as "spaces that have been created with the specific purpose of facilitating certain learning or providing didactic resources for teaching and learning processes" [5]. According to their nature, they can be divided into two large groups. Within the first group are institutional websites, which provide data on educational institutions, and database websites, such as research repositories [6]. On the other hand, there are websites of an educational nature, which are made up of educational intranets, where one can interact with the material provided, and websites of didactic material, which offer specific material to be used during the teaching-learning process.

Another contribution is that of Ng [7] who categorizes the characteristics of an educational website into three main aspects; the multimedia-oriented aspect covers the elements of the website, such as text formatting, graphics, animation, etc. On the other hand, the user-oriented aspect involves three important areas: usability, which refers to the ability of the website to be used by different people; accessibility, where the website is adapted to different audiences, including people with disabilities; and navigation, which refers to the ease with which the website and its different content blocks are used. Finally, to develop the elements of the education-oriented aspect, the author takes up Mayer's contribution to the Multimedia Learning Principles, which highlights the use of multimedia elements that promote cooperative learning [7].

For his part, Torres integrates various contributions to point out that the characteristics of educational websites can be categorized into three large groups: technical and aesthetic aspects; didactic and theoretical aspects; and psycho-pedagogical aspects [8]. The contribution of García-Valcárcel is also considered relevant, he highlights four important characteristics concerning the design and evaluation of web pages: the relevance of the information, the relevance of the structure and presentation of the information, the incorporation of learning facilitators and the appropriate use of emotions [9]. In short, most of the aspects mentioned by García-Valcárcel coincide with Torres, who identifies aspects linked to the content and the way it is presented, complementary resources that facilitate understanding, as well as an aspect linked to the emotions it is capable of generating in the student.

2.2. Websites for educational purposes

Educational videos are a type of digital resource that has become increasingly widespread in recent years due to their ease of storage and dissemination, which can be direct or online. Along these lines, García-Valcárcel states that "information and communication technologies are converging towards increasingly audiovisual and interactive applications" [10] and are therefore a complement that enhances learning. In this regard, Rodríguez, et al. argue that videos can be used as open educational resources, although they are commonly referred to as "didactic videos" due to the complexity of their composition, as they include audio, text and images combined in sequences to transmit a certain content [11].

Among the different purposes of video is the informative type [12], which is frequently used in teaching and is responsible for conveying the information and content that students must

learn, know and capture. Schmidt also offers a specific classification of educational videos according to the didactic objectives, classifying them as instructional, cognitive, motivational, and playful [13].

Regarding the characteristics of educational videos, Bravo proposes a series of characteristics according to their potential, such as a clear structure and learning purpose. In addition, he adds that "on their own, they are capable of transmitting complete educational content. They are specially designed to facilitate understanding and retention of content. [...] gives them a narrative structure that is easy to assimilate" [13].

He also emphasizes some syntactic elements such as images tailored to the concepts they are explaining, the complementary locution to the images, the elements separating blocks and sequences, the previous or posterior indicators that structure the content, the intentional repetitions, and the music, among others. These elements are fundamental when designing and evaluating educational videos based on the pedagogical purpose and the development of the intended content.

2.3. Self-instructional material

Self-instructional material is an important type of educational resource for self-directed learning, as it facilitates the study process and the development of various strategies. This resource allows students to direct their learning with the indirect support of the teacher [14]. Since it is material that will not be developed with the constant intervention of a teacher, it must be very complete and clear. In addition, they play a fundamental role in the learning process, in that they serve to guide the student as well as to favor self-regulation.

In this type of resource, there are several aspects that "must be interrelated, such as, for example, style, language level, presentation, structure, and complementary components." [15]. However, for this research, we will focus on some of the elements mentioned by Acosta [14], which are the didactic aids, the use of images, the typographic clues, and the activities section, which are presented below.

Table 1
Elements of the self-instructional material

Elements	Content characteristics
Teaching aids	Present an objective They provide a clear and precise message according to the level of the receiver
Use of images	They promote understanding of the theory
Typographical clues	Organize important information Shading, headings, italics, colors, symbols, etc. are used.
Activities	Promote reflection Provide synthesized information Are coherent with the objectives

3. Self-directed learning

Learning based on the rote transmission and appropriation of knowledge does not meet today's demands, as it represents a mismatch with the learning that society seeks to achieve in its citizens. In this sense, the learning society demands continuous, rapid learning and the need to learn how to learn [16]. Throughout the whole process, the teacher needs to act as a guide who helps to promote the achievement of the expected learning so that the student finally achieves autonomy [21], i.e., the aim is for the student to have the ability to manage their learning, develop autonomy and possess the intellectual and social tools that will enable them to learn continuously.

It is, therefore, necessary to develop in students a set of strategies that allow them to improve those aspects in which they have difficulty and to enhance those in which they are making good progress in their learning process. In particular, these strategies will enable them to make conscious and intentional decisions [17] and enhance their ability to make constant modifications to achieve their objectives [18]. They include techniques, operations, and specific activities and can be flexible, depending on the characteristics of the educational situation in which the action takes place [18].

Strategies can be of different types; however, we will highlight those that allow resource management, which according to Lamas include "time management [which] involves scheduling and planning study times, while environment management refers to the student's determination of his or her place of work" [19]. The need to promote these strategies lies in the progressive advance of distance education and the little experience students may have with this new form of teaching [20].

Similarly, there are cognitive strategies that, according to the authors Weinstein, Husman, and Dierking, allow students to acquire new information and integrate it with their previous knowledge, as well as to organize it and retrieve it when necessary [19]. However, for the proposal, Monereo's [18] classification of strategies was used and based on his review, six of the ten skills with their respective procedures were selected (Table 2).

Cabrales and Díaz argue that the ways of learning and teaching change according to the technologies that are becoming more important in the student environment; likewise, the development of new skills in students such as the use of social networks, the Internet and mobile devices change the way of learning [21]. In a study conducted by Marcos and Moreno on secondary school students (3rd ESO) in Spain, it is noted that students perceive that audiovisual resources facilitate the learning of conceptual content and therefore their ability to learn autonomously as long as the resource has been used previously in class [22].

Table 2
Selected skills and procedures to develop.

Skills	Selected procedures
Observation	Notetaking
Comparison and Data Analysis	Underline
Data classification and synthesis	Summary
Phenomena representation	Mind map
Interpretation and inference of phenomena	Paraphrase
Demonstration and assessment of learning	Oral expression

4. Description of “La Mochila de Koeko”

"La Mochila de Koeko" is a proposal that was created within the framework of the Strategies for Learning to Learn course at the Faculty of Education of the Pontificia Universidad del Perú, to promote the development of self-learning skills in primary school children. It consisted of a web page on which videos were hosted as chapters and complementary self-instructional materials to develop various strategies. A character called Koeko was created, an alien who was in charge of guiding the activities playfully and motivating active learning through missions focused on putting what was learned into practice.

The pilot experience took place in July and August 2020 in a secular organization that provides educational services in a vulnerable area of Lima. Around 50 primary school students developed strategies for self-study and strengthening autonomy in learning, including notetaking, underlining, summarising, and mind mapping, among others. The process was guided by the 5 teachers of the organization, who were trained in the use of the resources and accompanied during the process of applying the proposed activities through a personalized chat. Given the difficulty of some students to access the web, the communication channels were diversified and the form of delivery of educational resources was varied to respond to the conditions and limitations of connectivity of the families, so other means were used, among which WhatsApp

stands out. In addition, talks were held to learn about the experiences of teachers and parents, thus orienting them and involving them in the proposal.

5. Compilation of perceptions of teachers about the experience

To evaluate the experience of the teachers who worked on the educational proposal "La mochila de Koeko", their perceptions of the different web resources and the autonomous learning strategies that they worked on were collected. The age of the participants in the sample ranged from 54 to 58 years old and their work experience in the educational field ranged from 18 to 25 years.

Digital resources and learning were the categories that emerged from which were the subcategories: website, educational videos, self-instructional material, autonomous learning, and project assessment. These were reflected in a survey consisting of 25 items, using a 5-point Likert scale expressed in statements: "Strongly disagree" (0), "Disagree" (1), "Neither agree nor disagree" (2), "Agree" (4), "Strongly agree" (5) and an additional option called "Not used", in case the resource was not applied. Likewise, the structured interview technique was used to deepen the perceptions with the interview script instrument. Initially, 2 questions were asked to collect the age and length of service of the teachers and in the following section 9 questions were asked oriented to each of the subcategories of the study, and 2 questions were asked to collect general aspects of the proposal, which are presented in table 3.

Table 3
Interview guide

Subcategories	Questions
Website	Did you access the educational website and in what way? Did you find the contents of the website useful for learning the strategies? Why? Mention any that you remember. What aspect of the website do you think was most useful for learning the strategies?
Educational videos	Did you use the educational videos and in what way? Did you find the videos useful for learning the strategies? Why? Name any that you remember?
Self-instructional material	Did you use the self-instructional materials and in what way? Did you find the contents of the program useful for the learning of the students? Why? Name any that you remember.
Learning strategies	In your opinion, which of the contextual strategies (timetable or study environment) was best taught through the La Mochila de Koeko? Why? In your opinion, which of the cognitive strategies (underlining, summarising, paraphrasing, mind mapping, exposition of ideas) was best taught through the La Mochila de Koeko? Why?
In general	What aspect of La Mochila de Koeko do you consider to be the most valuable for learning strategies? Why? Would you consider adding or changing any aspect of La Mochila de Koeko?

The interviews were conducted via Zoom, recorded, and subsequently transcribed. The information collected was transferred into matrices with the perceptions collected per question and associated with the established categories and subcategories. In the matrices, the emerging elements were highlighted, i.e. the parts of the responses that stood out the most. Each emerging element was assigned a code, beginning with the letter E and a number according to the order of the interview. Similarly, P (question) and H (finding) were added, accompanied by the corresponding number according to the order of appearance of the element throughout the interview. This coding was of the open type since the fragments of information were analyzed as

they were obtained [23]; in this way, the codes revealed abstractions that the text contained, and that helped to gather new data for the central subcategories. Consequently, a categorization process was carried out in which the codes were grouped by families of subcategories to describe them and find similarities and differences, as well as an interpretative and descriptive analysis based on theoretical contributions.

Concerning the subcategory Website, it was identified that half of the teachers accessed via a mobile device, while the other half were unable to do so, as they received the materials via WhatsApp. This may indicate the ease with which teachers are now able to manage via messages, audio, and documents shared through this social network, as well as the need to adapt the format and presentation of resources to this type of device.

In terms of usefulness, they valued the content and the form of presentation positively, which is related to Torres [8], who emphasizes that both the technical and aesthetic aspects and the didactic and theoretical aspects of a web page must be relevant, of high quality and oriented towards achieving the objectives and adapted to the profile of the target audience. They also highlighted that the audiovisual aspect was the most attractive, as shown in the following vignettes:

"As they are small, for them everything enters through their eyes, and the videos were more attractive" (E1P3H1).

"...] the sounds create more expectations in the children" (E3P3H2).

On the other hand, the results of the survey also show a better weighting in the technical and aesthetic aspects, highlighting elements such as the relevance of the images and graphics with the content of the website and the legibility of the complementary audio to the website. This weighting was also evident in the didactic and pedagogical aspects, in terms of the coherence between the contents and the objectives of the page and the function of the activities proposed to reinforce what has been learned.

About the subcategory of educational videos, it can be seen that all the teachers reported using them and sending them to the children via WhatsApp, as well as access to the contents of the website. They also added that they tried to encourage students more explicitly, as indicated in the vignettes:

"After doing the day's activities, I would send them the video and motivate them" (E2P4H1). I would send: "Hi, guys, we are going to continue with the project, and I am going to send you a video so that you can improve and learn, encouraging you to come in" (E3P4H2).

Due to the context of the pandemic and the lack of internet access that prevented the students from surfing the web independently, the teachers found the WhatsApp messaging tool to be the ideal medium for disseminating the educational resource, as was pointed out in the case of the materials on the website. Added to this, this finding evidences the importance of teacher intermediation to guide the achievement of learning, such as constant motivation and periodic monitoring, especially during autonomous learning [21].

Another important finding was that all teachers indicated that the educational videos were useful for learning strategies. This is in line with the results of the survey, in which a greater weighting is given to aspects referring to the sequence of the video and how it allows understanding and assimilation of its meaning, which, according to Bravo, is one of the attributions corresponding to the high potential of educational videos [13]. In addition, a similar evaluation can be seen concerning the selection of narratives, characters, and feelings shown as generators of emotions that favor learning.

For the subcategory of the Self-instructional Material, it was identified that all the teachers made use of the material and that this was conceived as a key resource for the development of the proposal and for the learning of learning strategies in the students:

"The instructional material we sent them to complement the subject" (E2P6H1, E5P6H1).

"The idea was for them to analyze the video and to remember it in the worksheet." (E4P6H1).

It was possible to identify that, although the self-instructional material is designed for the student to do it autonomously [14], students in lower grades required more support from the teachers to carry out their activities. On the other hand, it is acknowledged that some students had difficulties in completing the worksheet and managed to overcome them with the use of audio or video, so it could be inferred that it did not fulfill its self-instructional function on its own:

"some children did find it difficult to complete the worksheet but encouraging them to watch the video made the children more enthusiastic" (E3P6H2).

"Although the (instructional) card provided us with support, we saw if it worked when they did their homework at school" (E4P7H3).

Regarding the subcategory autonomous learning, all teachers considered the teaching of contextual and cognitive strategies to be relevant. Thus, in terms of contextual strategies, the most valued aspect was the organization of the study environment:

"[...] Even though their environment is not very big, they made their small study space" (E1P8H2).

"[...] They felt more identified in being able to organize themselves" (E5P8H1).

"[...] (the students) realized that if they needed their pencil case to go one way or the other" (E4P8H1).

However, the organization of time was also acknowledged by most of the interviewees. This is evident when they mention that it was a key strategy since it allowed students to organize their time and manage their learning in a better way and that it was a new strategy since students were not familiar with it. They also mentioned that it was important for the students to

"...] learn that they have a moment and a time to do their activities" (E1P8H2).

Then, in what was mentioned by the teachers, it is evident how the management and appropriation of learning strategies by the students, generate the ability to make conscious and intentional decisions [17]. As mentioned above, students were able to better organize their study space according to their needs.

In terms of cognitive strategies, all interviewees agree that the most valuable one is an oral expression:

"The children had difficulties in expressing themselves" (E5P9H1, E2P9H1).

"The children started to develop, to lose their shyness" (E2P9H1).

Since many of their students expressed feelings of embarrassment and were self-conscious when giving an oral presentation. At the same time, some teachers also pointed out that the mind-mapping and underlining strategies were noteworthy.

On the other hand, the teachers commented that they recognized how their students applied the learning strategies in constant situations; that is, they observed the gradual acquisition of the strategy in the students based on the products they produced for school activities [18]. Therefore, it is evident that "students who are aware of their metacognitive strategies apply them to learning situations, problem-solving and memorization" [17].

Finally, about general aspects, the teachers rated the presentation of the content positively, highlighted the importance of the playful context in which it was developed, and emphasized the importance of integrating the use of the video with the different digital resources provided; this assessment can be seen in the following vignettes:

"The child has not taken it directly as a task but as a game" (E4P10H1).

"The videos and the worksheets that go hand in hand, as well as the instructions we were given" (E3P10H3).

"[...] having an intergalactic character is like something that makes them want to know more, that is, it is not something usual, so for them, it was something really interesting, novel and creative as well" (E5P10H1).

At the end of the interview, the teachers were asked about some recommendations they could make to improve the project. In this regard, they mentioned suggestions such as giving more movement to the characters, which is closely related to the characteristics of the educational video and the striking aesthetics it should have to attract its main audience [13]. They also commented that consideration should be given to increasing the number of activities given to the child to ensure understanding of the strategies and to broaden the educational levels at which the proposal is aimed, as the preschool level is recognized as a potential target audience and deserving of the development of autonomous learning strategies.

6. Conclusions

Based on the perceptions of a group of teachers about the educational proposal "La Mochila de Koeko", the teachers valued its components positively, highlighting the usefulness, coherence, and relevance between the technical and aesthetic aspects and the didactic aspects of the resources. They also perceived that the website facilitates user navigation due to its good organization and structure. However, they could not directly access the contents of the website due to a lack of connectivity and found WhatsApp as an alternative.

Concerning the educational video, it is evident that it was the resource most valued by the teachers for the images and sounds used; in addition, they valued the short duration of the videos, which kept the students' attention and facilitated learning. As for the self-instructional materials, from the teachers' perspective, they were key to the development of the proposal and allowed the children to have a space to put into practice what they had learned, but they were not sufficient to fulfill their instructional character on their own.

Likewise, regarding autonomous learning strategies, the teachers reported that the resources of the educational proposal allowed for the development of skills for the organization of space and cognitive strategies for oral expression. In addition, they highlighted the playful and visually attractive way in which the strategies were presented to the students and the impact that the use of virtual resources has on student motivation. Finally, it is considered relevant to consider future research that focuses on analyzing students' perceptions of autonomous learning strategies during the teaching-learning process and to continue collecting teachers' perceptions in different contexts. The findings allow us to identify areas for improvement in the "La Mochila de Koeko" proposal and to reflect on the need to create digital resources and web content to complement the teaching-learning process.

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