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# Technology as a tool to reduce school dropout rates in Costa Rica

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## **Technology as a tool to reduce school dropout rates in Costa Rica**

### **La tecnología como herramienta para disminuir el fenómeno de la deserción escolar en Costa Rica**

### **A tecnologia como ferramenta para reduzir o abandono escolar na Costa Rica**

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#### **Abstract**

**Objective:** This study aimed to research the factors that cause school dropout and whether technology can positively influence the reduction of this phenomenon in adolescents between 11 and 17 years old. **Method:** The research was conducted under a qualitative-exploratory approach, according to [Hurtado \(2010\)](#) through an in-depth interview based on [Hernández-Sampieri et al. \(2017\)](#). The sample was 92 students, from two schools located in two different regions in Costa Rica for the year 2021. **Results:** The gender distribution and the dropout rate in the selected sample indicate that the male gender has the highest dropout rate with 65.22%, some studies can corroborate like [Santodomingo \(April 19, 2021\)](#), the main reasons for this result are the abundance of unskilled jobs for men and the value system associated with the male gender. **Findings:** The female gender has a higher level of dropout in rural areas (53.12%), and one important reason is teenage pregnancy. **Conclusions:** Students who drop out of the school system do so mainly for reasons associated with a lack of interest in classes and economic problems in the family environment. Finally, it is concluded

that for a virtual education process to be successful, it is not only enough to use technology as a tool, the teacher must establish a teaching model that is agile, flexible, and dynamic to maintain the student's interest. Among the recommendations, measures are proposed to reduce school dropout rates in the institutions.

**Keywords:** Dropout; non-school; technology; evolution; unemployment.

## **Resumen**

**Objetivo:** Este estudio tuvo como objetivo investigar los factores que causan el abandono escolar y si la tecnología puede influir positivamente en la reducción de este fenómeno en adolescentes entre 11 y 17 años. **Método:** La investigación se realizó bajo un enfoque cualitativo-exploratorio, según [Hurtado \(2010\)](#) a través de una entrevista en profundidad basada en [Hernández-Sampieri et al. \(2017\)](#). La muestra fue de 92 estudiantes, de dos colegios ubicados en dos regiones diferentes de Costa Rica para el año 2021. **Resultados:** La distribución por género y la tasa de deserción en la muestra seleccionada indican que el género masculino tiene la mayor tasa de deserción con un 65,22%, algunos estudios lo pueden corroborar como [Santodomingo \(April 19, 2021\)](#), las principales razones de este resultado son la abundancia de trabajos no calificados para los hombres y el sistema de valores asociado al género masculino. **Conclusiones:** El género femenino tiene un mayor nivel de deserción en el área rural (53,12%), y una razón importante es el embarazo adolescente. **Conclusiones:** Los estudiantes que abandonan el sistema escolar lo hacen principalmente por razones asociadas a la falta de interés en las clases y problemas económicos en el entorno familiar. Finalmente, se concluye que para que un proceso de educación virtual sea exitoso, no sólo basta con utilizar la tecnología como herramienta, el docente debe establecer un modelo de enseñanza ágil, flexible y dinámico para mantener el interés del alumno. Entre las recomendaciones, se proponen medidas para reducir el abandono escolar en las instituciones.

**Palabras clave:** Abandono escolar; no escolarización; tecnología; evolución; desempleo.

## Resumo

Objetivo: Este estudo teve como objetivo investigar os fatores que causam a evasão escolar e se a tecnologia pode influenciar positivamente a redução desse fenômeno em adolescentes entre 11 e 17 anos. Método: a pesquisa foi realizada sob uma abordagem qualitativa-exploratória, conforme [Hurtado \(2010\)](#) por meio de uma entrevista em profundidade baseada em [Hernández-Sampieri et al. \(2017\)](#). A amostra foi composta por 92 alunos, de duas escolas localizadas em duas regiões diferentes da Costa Rica, para o ano de 2021. Resultados: a distribuição de gênero e a taxa de evasão na amostra selecionada indicam que o gênero masculino tem a maior taxa de evasão com 65,22%, alguns estudos podem corroborar isso como [Santodomingo \(April 19, 2021\)](#), as principais razões para esse resultado são a abundância de empregos não qualificados para homens e o sistema de valores associado ao gênero masculino. Conclusões: O gênero feminino tem um nível mais alto de abandono escolar na área rural (53,12%), e um motivo importante é a gravidez na adolescência. Conclusões: Os alunos que abandonam o sistema escolar o fazem principalmente por motivos associados à falta de interesse nas aulas e a problemas econômicos no ambiente familiar. Por fim, conclui-se que, para que um processo de educação virtual seja bem-sucedido, não basta usar a tecnologia como ferramenta; o professor deve estabelecer um modelo de ensino ágil, flexível e dinâmico para manter o interesse do aluno. Entre as recomendações, são propostas medidas para reduzir o abandono escolar precoce nas instituições.

**Palavras-chave:** Desistência; não escolaridade; tecnologia; evolução; desemprego.

## Introduction

Education for all ages has given a strong change from a few years ago until today, lately the term virtuality is heard everywhere, either by students, teachers, relatives, and even in the news, we know that it is a very useful tool in these times, however, it generates a very strong doubt in a fairly representative population, and this is: has the school dropout has given any increase since we changed the face-to-face mode by the

virtual? This is worrying because it causes social problems such as crime, drug addiction, and unemployment in a country, so in this research, we will answer some questions that are generated as a result of school dropout, we will talk a little about the issue of school dropout, its background and how technology can help us to reduce this problem positively.

## Literature Review

It is a fact that school dropout significantly limits the employability that will develop in the future of a country since there is a strong link between school dropout and poverty (Rojas, 2000). However, this problem is not new to Costa Rica, Hernández, Alvarez and Aranda (2017) mention that school dropout is a fundamental problem in Costa Rican democracy because it requires a lot of effort in coordination with teachers and officials in the education sector to control this phenomenon, without achieving the expected success, because the population has not been able to appreciate in national terms the magnitude of the problem. It is for this reason, the importance of making this problem visible in the hope of awakening interest in its study.

Jiménez and Gaete (2010), conducted a study to measure academic performance, retention, and dropout, using a methodology that combined a quantitative and qualitative approach, based on questionnaires and interviews with 125 students to study the reasons for school dropout. Thanks to this research, it was identified that due to an academic conception in the teaching regime and different social, geographic, and demographic factors, there is a systematic dropout of students throughout the educational system, both in primary and secondary school, along with the appearance of dropout rates, which denote different reasons for school dropout among men and women.

However, the evolution and acceleration of Information and Communication Technologies (ICT) in the last decade have significantly boosted all processes in all educational fields, making room for virtual education (Jiménez, Mora, & Cuadros, 2016), although the term virtual education is considered a relatively new

phenomenon, it is not, since distance education dates back to the beginning of the 19th century. [Jardines \(2009\)](#) highlights among his findings that the first studies of virtual education appeared between 1970 and 1980, where reference is made to distance education as the phenomenon where in the teaching process the educator and the learner are at a distance from each other.

A response must be given to the knowledge gap related to technology as a tool to reduce the phenomenon of school dropout in Costa Rica, many schools, teachers, and the education system itself were not prepared for a sudden change from traditional education to virtual education, This knowledge gap has been complemented little by little with the different trainings that have been received in schools and universities, the vast majority also virtually forcing to change the traditional way of working in the company and in the school, but at the same time has strengthened the dynamics of the learning system, because we are all prepared for both models, the physical model and the virtual model.

We must ask ourselves if the educational system is efficient; an educational system is efficient when it achieves its teaching objectives in an adequate time and without wasting human and financial resources. Two serious problems that affect the efficiency of the educational system are repetition and desertion. A student entering the educational system has three options: pass, repeat, or drop out. Repetition and dropout imply a waste of economic and human resources that affect the efficiency levels of the system. Therefore, the three phenomena are closely interrelated ([Moreno & González, 2005](#)).

School dropout has been a priority issue in Latin America ([Espíndola & León, 2002](#)). Likewise, adolescent pregnancy has a direct correlation with school dropout ([Molina et al., 2004](#)), and based on [Jadue \(2002\)](#) there are psychological factors that predispose to low performance, failure, and school dropout. It is logical to think that each family has its particular problems, but there are social, economic, and environmental conditions and factors that predispose children to drop out of school.

[Obando \(07 June, 2021\)](#), highlights those four historical events that contributed to

the evolution and advancement of virtual education. The first, associated with the development of the railroad, provided a more reliable and faster postal service, allowing students to complete their assignments and send them by mail. Next, the establishment of the British Open University established a multi-media approach, in other words, the use of printed materials and radio and television broadcasts. In the third position, the advance of technological networks and satellite technologies in the early 1980s, which enhanced direct communication between teacher and student, and finally the massification in the use of the Internet, which allowed the teaching processes to evolve through the use of e-mail, video conferencing platforms and instant messaging exchange systems.

However, in the year 2020, a global event occurred that accelerated the adoption of virtual education, the COVID-19 pandemic. Several authors agree that the impact of the pandemic generated an increase in the interaction between the teacher and the student virtually, since it went from a limited interaction with a small number of students to a more massive, dynamic, and simultaneous interaction with a large number of students, regardless of the distance (ONU, 2021). In addition, virtuality is an important factor in reducing the operating costs of educational institutions and a mechanism to keep both teachers and students connected and updated (León, 2021; MEP, 2020b).

However, in Costa Rica, social inequality between different geographical areas of the country and sectors of society makes it difficult for students to access virtual education (Calderón-Madrigal, 2021). Consequently, the Ministerio de Educación Pública (MEP) has sought mechanisms to facilitate student access to this new teaching modality, for which it has promoted cooperation agreements with the private sector to achieve this goal (Castro, November 9, 2020), an example of this was the initiative called *aprendo en casa* (I learn at home), whose objective was to include the student population nationwide in a virtual teaching process through personal computers and tablets provided by the MEP to continue their studies from home in times of pandemic (Aguilar, November 12, 2020), and the result of this program captured the attention and collaboration of the business sector that joined the cause and contributed with the donation of the necessary technological equipment (Arce, January 18, 2021).

## Research Methodology

The research was conducted under a qualitative-exploratory approach as it sought to develop the object under investigation, looking for regularities and relationships between the components of the study (Creswell & Poth, 2018). Also, a subcategory was established within the descriptive approach, which sought to identify the properties and characteristics of the object of study related to the identification of the main causes that give rise to school dropout and establish the link with technology as a tool to reverse this problem and explain the trend of the study population (Mäki, 2005). Also, to model the factors that generate school dropout in Costa Rica, we proceeded to an exploratory type of research, in which, the most important thing was to detail more precisely and thoroughly each factor involved: how they were presented, how they were, and how they manifested themselves, guided by the epistemological perspective of constructionism (Rockmore, 2005). Additionally, it was assumed that ICTs could contribute positively to the reduction of school dropout, through the promotion and acceleration of virtual education.

According to Hurtado (2010), in a qualitative study, factors should be established through categories of analysis, which are defined based on the abstraction of one or several common characteristics of a group of objects or situations that allow them to be classified. To achieve this objective, the categories were built throughout the research process, starting from general categories and the research question that sought to determine the main causes of school dropout in Costa Rica, through an in-depth interview that allowed collecting the data, using a questionnaire for subsequent analysis, taking as a basis the theory developed by Hernández-Sampieri et al. (2017) as a scientific guideline in the area.

The unit of analysis, from which the observable consequences were derived (Bunge, 2007; Holton, 1998; King, Keohane, & Verba, 2007) were the factors that condition school dropout in Costa Rica for the year 2021, the sample for this research being students between 11 and 17 years of age from two schools located in two different regions in Costa Rica for the year 2021, the total number of

participants being 92 students.

The in-depth interview used a semi-open questionnaire to observe the absolute distribution of frequencies to be able to describe the most recurrent factors that interfere in school dropout, together with the counting of the most common words and phrases that indicate the reasons for school dropout and requirements to continue the educational process of the students interviewed.

## Results and Discussion

The results obtained in this section take as a central point the findings of the in-depth interviews conducted through a questionnaire applied to the 92 students interviewed in the two schools located in Costa Rica, initially an analysis of the closed questions was made through the use of absolute frequency distribution. Then the contrast of the most common words and phrases used gives rise to the causes of dropping out of school.

[Table 1](#) presents the results obtained to determine the gender distribution and the dropout rate in the selected sample.

Table 1. Gender with the highest dropout rate

Gender	Number of people	Percentage of representation (%)
Female	32	34.78%
Male	60	65.22%

Note. Own elaboration based on the results obtained.

The results indicate that the male gender has the highest dropout rate with 65.22%, which shows that in both institutions, regardless of their geographical location, male students tend to drop out of school. There are currently scientific studies, such as the one conducted by [Santodomingo \(April 19, 2021\)](#), which corroborate this result and indicate that the main reasons for this result are the abundance of unskilled jobs for men and the value system associated with the male gender.

[Table 2](#) shows the results obtained about dropout by gender, to evaluate the impact

of the geographic location of the educational center.

Table 2. Location of the defective gender

Location by gender	Number of people (male)	Percentage of representation (%)	Number of people (female)	Percentage of representation (%)
Centro Educativo San Carlos (Limón)	44	47.8%	17	53.12%
Centro Educativo Liceo Escazú (San José)	48	52.2%	15	46.88%

*Note.* The data presented is a comparison between schools and provinces—own elaboration based on the results obtained.

An interesting aspect to highlight in [Table 2](#) is that the number of dropouts is very similar between both regions (Limón and San José), being a difference of 4.4% (equivalent to 4), this may be due to the number of students that each campus has (1980 in Escazú and 120 in Limón) according to the information registered in the MEP ([MEP, 2020a](#)). Also, the female gender has a higher level of dropout in rural areas (53.12%), which gives us evidence that this population faces more conflicts to carry out their study plans, compared to women in urban areas. [Wayka \(9 Ene, 2019\)](#) in her study identified that the main reason is due to family problems and is generally associated with teenage pregnancy. [Table 3](#) presents the results associated with the grade of schooling of dropout students at the Centro Educativo San Carlos in Limón, where 28 students dropped out during their secondary education (seventh to eleventh grade) and 16 students dropped out in the primary education cycle (first to sixth grade).

Table 3. Level of schooling at Centro Educativo San Carlos (Limón)

Grade of schooling	Number of people	Percentage of representation (%)
Secondary Education	28	63.63%
Primary Education	16	36.37%

*Note.* Own elaboration based on the results obtained.

[Table 4](#) shows a similar result associated with the level of schooling of dropouts at the Centro Educativo Liceo de Escazú in San José, where 81.25% of the students dropped out during the secondary education cycle.

Table 4. Level of schooling at Centro Educativo Liceo de Escazú (San José)

Grade of schooling	Number of people	Percentage of representation (%)
Secondary Education	39	81.25%
Primary Education	9	18.75%

*Note.* Own elaboration based on the results obtained.

Both tables (3 and 4) show a common pattern of behavior, where the level of school dropout is higher in secondary education, i.e. the higher the level of schooling, the higher the dropout rate. [Figueroa \(2021\)](#), obtained a similar result in a study conducted in Sinaloa, Mexico, during the COVID-19 pandemic, the main cause of this phenomenon being the lack of contact between students and teachers, due to the lack of digital platforms to facilitate communication.

[Table 5](#) presents the results of the main causes identified by the students who dropped out of the Centro Educativo San Carlos in Limón, with lack of interest in the classes and economic problems of the students as the highest value and with the same result (37.5%).

Table 5. Causes of abandonment in the Centro Educativo San Carlos (Limón)

Causes of abandonment	Number of people	Percentage of representation (%)
Lack of interest in classes	17	38.63%
Financial problems	17	38.63%
Family problems	10	22.74%

*Note.* Own elaboration based on the results obtained.

Finally, [Table 6](#) shows the causes identified by the students who dropped out of the Centro Educativo Liceo de Escazú, with lack of interest in classes having the highest level of relevance (50%), followed by economic problems (31.25%) and culminating with family problems (18.25%).

Table 6. Causes of abandonment in the Centro Educativo Liceo de Escazú (San José)

Causes of abandonment	Number of people	Percentage of representation (%)
Lack of interest in classes	24	50%
Financial problems	15	31.25%

Family problems

9

18.75%

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Source: Own elaboration based on the results obtained.

The results previously presented coincide in that the lack of interest in classes by students in both institutions is the main reason for dropping out of school, being this a very important element to be considered when establishing a retention strategy for students to reduce the dropout rate. [Arias et al. \(2023\)](#) developed a report where they indicate that one of the mechanisms to reduce school dropout due to lack of interest of students is through the incorporation of technology as a tool in the teaching process, to motivate students to continue with their educational process and help reduce the costs incurred in their learning process, this being another factor identified in the findings.

Additionally, as part of the open-ended questions, it was identified that the words and phrases most frequently repeated by the interviewees were economic problems, problems in moving from home to the educational center, and lack of interest in classes. [Jiménez, Mora and Cuadros \(2016\)](#) emphasize that technology is an input that helps institutions to reduce school dropout since it allows streamlining the educational process through the incorporation of the virtual education model, which helps students not to travel to educational centers, but at the same time streamlines communication between teacher and student through agile and simple communication platforms, thus allowing teachers to offer more dynamic and simple classes according to the participant's needs.

## Conclusions

The goal of the study was to identify the main factors that cause school dropout in Costa Rica and to identify whether technology can be a tool to reduce the impact of school dropout through the incorporation of a teaching model based on virtual education.

Additionally, it was possible to identify that school dropout is a problem that affects our country on a large scale, both in urban and rural areas, thanks to the results

obtained from a group of students (former students) who collaborated with the research.

It is important to take into consideration that school dropout is a complex psychosocial problem, which emphasizes social and political aspects. In addition, the causes of school dropout are due to economic factors, where for different reasons the student has to leave his studies to work and contribute at home, family factors, or factors of disinterest in the subjects. However, with the existing technological advances, many students around the country will have the possibility to study, because thanks to virtual classes, the person will be able to connect without the need to go in person, which facilitates thousands of people who find it difficult to go to classes in person (mainly people in rural areas), technology will also establish a model of agile, dynamic and flexible teaching so that the student can achieve learning objectives according to their availability.

In the area of disinterest in the classes, as mentioned throughout the research, teachers could implement a technological educational method where interest arises in the students and motivates them to continue with their educational process, at the same time the classes could be made more dynamic and in a different way than the traditional way, focusing on developing the technological skills of the students.

Finally, it is important to emphasize that the institutions should take a series of steps to reduce the level of school dropout, which is why the following recommendations are made:

1. Understanding the functionality of the online modality. The virtual modality requires a lot of motivation, discipline, and being self-taught to achieve success in learning, the information found on the Internet is a lot, so this can be useful for students.
2. Appropriate use of technology. Students must take full advantage of the tools that virtuality offers because different apps help students make summaries and plan time properly, or tutorials on the Internet. Likewise, it is possible to take advantage of the recordings of the classes, since it is possible to review the subject matter.
3. Creating a suitable environment for study. The environment has to be quiet, and

calm, without distractions.

4. Have goals and objectives. Review the course notes, as this will improve memory and help to better absorb what has been learned.
5. Plan your time. It is important to be consistent with study habits, as this will help in aspects such as concentration and absorbing the acquired knowledge. The flexibility offered by virtual classes, in many cases, can lead to the postponement of homework. To avoid this problem, it is advisable to keep in mind all the tasks to be done.
6. Have a positive attitude and take breaks. Always have active motivation, participate in class, and collaborate with classmates, it is also important to collaborate with classmates.

### **Future Research Lines**

The beginning of the digital era and the speed with which new technological innovations are emerging have changed the way society teaches in a globalized world, where there is no doubt that the future of the individual will be immersed in the development of competencies associated with the use of technology.

The practical implications of the results obtained lead to a change of approach from the perspective of teaching in school education; therefore, virtuality will become an instrument of the country's strategy to ensure global competitiveness.

Therefore, the results of the study will serve as input for interested institutions, and as a guide for the promotion and leadership of this virtual education modality under a competitiveness approach.

The implications from the theoretical perspective contemplate the development of research works in the academy, which include additional elements in the existing relationship between the teaching processes in school education and the use of technology to increase the performance, learning, and competitiveness of the individual, for which the future lines of research are varied since the subject of study is very recent, broad and with infinite ramifications.

## Conflict of interest

The authors have no conflict of interest to declare.

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