


Virtual Escape Rooms: a gamification tool to enhance motivation in distance education

Escape Rooms virtuales: una herramienta de gamificación para potenciar la motivación en la educación a distancia



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ABSTRACT

This study addresses the challenge of student demotivation in distance higher education and how it affects content assimilation. Moreover, it proposes an innovative solution through the application of the Attention, Interest, Desire, and Action (AIDA) model and the design and creation of a Virtual Escape Room, which focuses on the content of the International Trade subject. The AIDA model was implemented to capture students' attention, arouse their interest through challenges, maintain their desire to learn, and promote action in solving the necessary questions to advance to the next level and obtain a reward. To measure how respondents perceived this tool, a self-managed survey was launched at the end of the Escape Room, both to UCAM students and an external group of various nationalities via social media. The results show a significant increase in the commitment and motivation of the students, which translates into better content assimilation. The Virtual Escape Room proved to be an effective tool to increase students' interaction with study materials. The findings suggest that the application of the AIDA model in distance education can offer a revolutionary approach to teaching in higher education. The Virtual Escape Room, as a means to implement this model, demonstrates its potential in combating student demotivation and improving content assimilation.

Keywords: AIDA model; gamification; motivation; online learning; distance education; higher education.

RESUMEN

Este estudio aborda el desafío de la desmotivación del alumnado en la educación superior a distancia, y cómo afecta la asimilación de contenidos. Además, propone una solución innovadora a través del modelo de Atención, Interés, Deseo y Acción (AIDA) y la creación de una *Escape Room* Virtual. Se diseñó una *Escape Room* Virtual centrada en los contenidos de la asignatura Comercio Internacional. El modelo AIDA fue implementado con el fin de captar la atención de los estudiantes, despertar su interés a través de retos, mantener su deseo de aprender y promover la acción en la solución de las preguntas necesarias para pasar al siguiente nivel y obtener la recompensa. Para medir cómo los encuestados percibían esta herramienta se lanzó una encuesta autogestionada insertada al final de la *Escape Room*, tanto a alumnos de la UCAM como a un grupo externo de diversas nacionalidades a través de redes sociales. Los resultados muestran un incremento significativo en el compromiso y la motivación de los estudiantes, lo que se traduce en una mejor asimilación de los contenidos. La *Escape Room* Virtual resultó ser una herramienta eficaz para incrementar la interacción de los estudiantes con los materiales de estudio. Los hallazgos sugieren que la aplicación del modelo AIDA en la educación a distancia puede ofrecer un enfoque revolucionario para la enseñanza en la educación superior. La *Escape Room* Virtual, como medio para implementar este modelo, demuestra su potencial en la lucha contra la desmotivación del alumnado y la mejora en la asimilación de contenidos.

Palabras clave: modelo AIDA; gamificación; motivación; enseñanza online; enseñanza a distancia; educación superior.

INTRODUCTION

In today's digital age, distance education has become an essential component of the global educational landscape (Pesántez et al., 2021). Increasing accessibility of the Internet and digital technologies have facilitated the expansion of education beyond the physical classroom, allowing students to learn at their own pace and in their own space. However, despite its advantages, distance education also poses unique challenges, especially in terms of student engagement and motivation (Trinidad, 2020). In this context, innovative teaching methods that can enhance the distance learning experience are of great interest to educators and researchers.

One such innovation is gamification, which involves the application of game elements in non-game contexts to increase motivation and engagement (Arufe et al., 2022). In education, gamification can take many forms, ranging from points systems and leaderboards to full games integrated into the curriculum. Virtual Escape Rooms are an example of the latter (Vergne et al., 2020). These games, which require players to solve a series of challenges to 'escape' from a virtual environment, can provide an active, student-centred learning experience that is very different from traditional forms of teaching (Streiner et al., 2019).

Despite the growing interest in virtual Escape Rooms and gamification in education, there is still much we do not know about how these strategies can be used effectively in distance education (Ouariachi & Wim, 2020). How do students perceive virtual Escape Rooms in a distance learning environment? How does participation in a virtual Escape Room affect student motivation and engagement? How can educators design and implement virtual Escape Rooms effectively in their distance education courses? These are some of the questions that this study aims to answer.

The aim of this study is to examine students' perceptions of gamification in distance education through the usage of virtual Escape Rooms. Specifically, we will use the AIDA model of sales, which refers to consumers' Attention, Interest, Desire, and Action, as a framework to analyse students' responses to the virtual Escape Room. Through this study, we hope to provide a greater understanding of how virtual Escape Rooms can be used to enhance the distance learning experience.

The remainder of this article is organised as follows: the next section provides a literature review on distance education, gamification and virtual Escape Rooms. This is followed by a description of the study methodology, including the sample selection, the design of the virtual Escape Room and the data collection instrument. Then, the results of the study are presented and discussed in the following sections. Finally, it concludes with a summary of the main findings and implications for practice and future research.

LITERATURE REVIEW

Research on distance education and gamification

Distance education has been the subject of much research in recent decades, especially with the rise of digital technologies that have facilitated its implementation and expansion. Studies have shown that distance education can offer a number of benefits, such as flexibility in terms of time and place, the possibility to learn at a

personalised pace, and the opportunity to access resources and learning experiences that may not be available in a traditional classroom setting (Castro & Tumibay, 2021). However, a number of challenges have also been identified, such as a lack of face-to-face interaction, a sense of isolation, and the need for self-discipline and time management skills (Lee et al., 2022).

In this context, gamification has emerged as a potential strategy to enhance the distance learning experience. Educational gamification refers to the application of game elements in non-game contexts with the aim of increasing learner motivation and engagement (Castillo-Mora et al., 2022). In education, gamification can take various forms, from point systems and leaderboards to full games integrated into the curriculum. Research has shown that gamification can have positive effects on student motivation, engagement in learning, and academic performance (Manzano-León, Camacho-Lazarraga et al., 2021). Several authors have shown that gamification methodology has benefits such as the development of critical thinking, creativity, social skills, and improved problem-solving skills, among others, but to be truly effective, it must be properly planned and developed (Pacheco, 2019; Martina & Göksen, 2022).

Research on Escape Rooms in education

In the context of university distance education, teachers face the challenge of adapting to the profile of students, who are accustomed to new technologies and audiovisual formats. Therefore, it is essential to provide materials that are attractive and facilitate their teaching-learning process, while minimizing demotivation (Álvarez-López & Sampablo-Buezas, 2020; López & Ortega, 2020).

Virtual Escape Rooms are an example of gamification that has gained popularity in recent years. These games, which require players to solve a series of puzzles to "escape" from a virtual environment, can provide an active, student-centered learning experience. Studies have shown that virtual escape rooms can enhance student motivation, foster critical thinking, and improve problem-solving skills (Duggins, 2019; Makri et al., 2021).

Escape rooms, both in their face-to-face and virtual versions, have emerged as an innovative educational tool. However, it has been the virtual version that has experienced significant growth in recent years, largely driven by the Covid-19 pandemic (Salvador-Gómez et al., 2022; Manzano-León, Aguilar-Parra et al., 2021). According to López and Sánchez (2019), Universidad Rey Juan Carlos I pioneered the implementation of this virtual tool with their students in 2018. The results evidenced its usefulness as a motivational resource to reduce demotivation and assess collaborative work (Salvador-Gómez et al., 2022; Zarco et al., 2019). This student-centered approach and the integration of innovative digital technologies are key aspects to improving the learning experience in distance higher education.

Zarco et al., (2019) and Segura-Robles and Parra-González (2019) highlight several key elements for the effective design of an educational Escape Room. These include the consideration of time, which should be divided into three distinct phases (before, during and after the game); the difficulty of the activities, which should be balanced to suit the level of the players; the learning objectives, which should be established beforehand and evaluated afterwards; the theme and space, which should be adapted to motivate the participants; the riddles, which are the core of the game and should be

engaging and creative; the technology and materials, which can enhance the experience if used appropriately; the assessment, which provides feedback on learners' progress; and the rehearsal, which should be conducted at least once before starting the game. Cordero (2018) adds that the success of the Escape Room depends on the initial cognitive shock and conflict that occurs in the learner's mind, which underlines the importance of designing an attractive and novel game start.

On the other hand, authors such as Salvador-Gómez et al., (2022); López-Pernas et al. (2019) and Gordillo et al., (2020) establish a series of stages and requirements for its correct development: in the first stage, the objectives and competencies to be addressed with the test are selected. In the second stage, the argumentative thread is developed. Taking into account the characteristics of the course and the students, the scenario, the story and the riddles must be correctly designed so that they connect with the students. Thirdly, general aspects are specified, such as whether the activity will be played in groups or individually, through which platform and which devices, the specific materials they will need to solve the riddles, and whether it will be carried out with or without monitoring, among other aspects. Fourthly, the best software to develop the application must be selected. Among the different tools available on the market, the most appropriate one must be selected, for example, Google, Google Forms, BreakEdu or Genially. Fifth, the challenges are chosen and constructed. The riddles must be balanced to the level of the players and the selection of the sequence to solve them is crucial. There are three main types of sequences: linear, open-ended and hybrid. In the linear sequence, the challenges follow a specific order, where the solution of each challenge unlocks the next one until the final solution is reached. This type of sequence may be suitable for the educational context, as it encourages teamwork. In the open-ended sequence, there is no specific order and students can tackle the challenges in any order they see fit. Finally, the hybrid sequence combines elements of both, with some challenges needing to be unlocked through smaller challenges, but without a specific order for the final resolution (Salvador-Gómez et al., 2022). Sixth, thought must be given to the construction of clues to prevent students from becoming demotivated and abandoning the game because they are unable to go through the riddles. When designing them, it will be decided whether they are internal or external clues and also how to design penalty mechanisms to prevent them from overusing clues. In the seventh stage, the immersion scenario is developed, seeking to make it attractive and to connect with the interests and preferences of the students. In the eighth stage, the instructions that will be necessary to work on the challenges are detailed. And in the ninth stage, the Escape Room is tested to correct possible failures during its implementation.

Research on AIDA model in education

The AIDA model, which refers to the Attention, Interest, Desire, and Action of consumers, has been widely used in the marketing field to analyze consumer responses to products and services (Kulkarni et al., 2020). However, its application in education is relatively new. Some studies have begun to explore how the AIDA model can be used to analyze student responses to teaching and learning strategies, although only at a theoretical level and as a method to explain training choices (Shala, 2020; Polk, 2018).

The design of Escape Rooms should be planned to maximize these benefits, so it is considered necessary to follow specific guidelines. In this sense, looking for a methodology that facilitates this planning could ensure that the virtual Escape Room allows the obtaining of these benefits. Accordingly, the AIDA model could be useful both for planning and for its own assessment.

The AIDA model has been used as a marketing tool to develop effective communication strategies for the sale of goods and services. This model proposes that consumers respond to marketing messages following cognitive (interest), affective (desire) and conative (action) sequences, so first it is necessary to capture their attention and then to maintain their interest in order to create a desire which finally leads them to purchase actions.

The first step in the cognitive hierarchy is focused on finding ways to attract and retain the consumer's attention, using striking images, colors, shapes and attractive characters. If this phase is done properly, the potential buyer will want to know more. But attention alone will not lead to sales. This attention must be maintained to generate interest in the product. Demonstrations, explanations and information conveyed to the buyer are important in this phase. Next, desire must be generated. To do this, it is very important to know how to connect the buyer's interests and needs with the product's features. Finally, for the process to be complete, potential buyers or consumers must be motivated to make the purchase. In this phase, emphasis is placed on the benefits to be obtained by the buyer and a sense of urgency is generated by offering discounts, prizes and other promotional strategies.

These identified phases of the AIDA model can be used to design an active teaching-learning tool (Polk, 2018), such as, for example, an Escape Room:

1. Once the learning objectives and competencies to be addressed have been chosen, creating an engaging story can serve as bait to capture the learners' interest and achieve an immersive experience. The use of engaging visual and auditory resources will capture the learner's attention, and the use of a stimulating story and context will maintain interest in following the process. This means that, in addition, the duration of the activity, the place of development, the materials needed, the software, the formats and the function within the course have been clearly delimited (Gómez et al., 2022).
2. To generate interest, the student must have all of the above and the necessary information for the successful fulfilment of this activity. The instructions and game rules are very important in this phase since, if the student does not understand how it works or does not have the resources to succeed, they will become demotivated.
3. In the affective stage, desire, the challenges and their difficulty must be well selected. It is important that their sequence allows the achievement of the learning objectives, but also stimulates the learner to continue with the activity until its completion. A major difficulty can lead to demotivation, but this is also the case if the challenges are too easy. Increasing difficulty in the challenges can be attractive if accompanied by additional clues when the learner stalls or by the possibility of returning to an unsuccessful previous challenge.
4. Finally, in order to get the learner to perform the activity and thus achieve the established objectives, it is very important to correctly establish the rewards of the

game. Students must know how the performance of the activity will affect their assessment in order to promote their action.

Another benefit of this model is that it also allows for the evaluation of satisfaction with the actual resource (Manafe & Pramita, 2022; Polk, 2018), as a questionnaire can be created based on the objectives to be achieved in each phase described in the model.

Despite the growing research in these areas, there are still gaps in the literature that this study aims to fill. In particular, there is a lack of research on how virtual Escape Rooms are perceived by students in a distance learning environment and how these perceptions can be analysed using the AIDA model. Furthermore, although gamification has been studied in the context of distance education, most studies have focused on more general gamification strategies, such as point systems and leaderboards, and there is a lack of research on the application of whole games, such as virtual Escape Rooms, in this context. This study aims to fill these gaps by providing an in-depth exploration of students' perceptions of virtual Escape Rooms in distance education and using the AIDA model as a framework for analysis.

In summary, the existing literature provides a strong foundation for research on distance education, gamification and virtual escape rooms. However, there is still much we do not know about how these strategies can be used effectively in distance education. This study aims to contribute to the existing literature by providing a greater understanding of how virtual Escape Rooms can be used to enhance the distance learning experience.

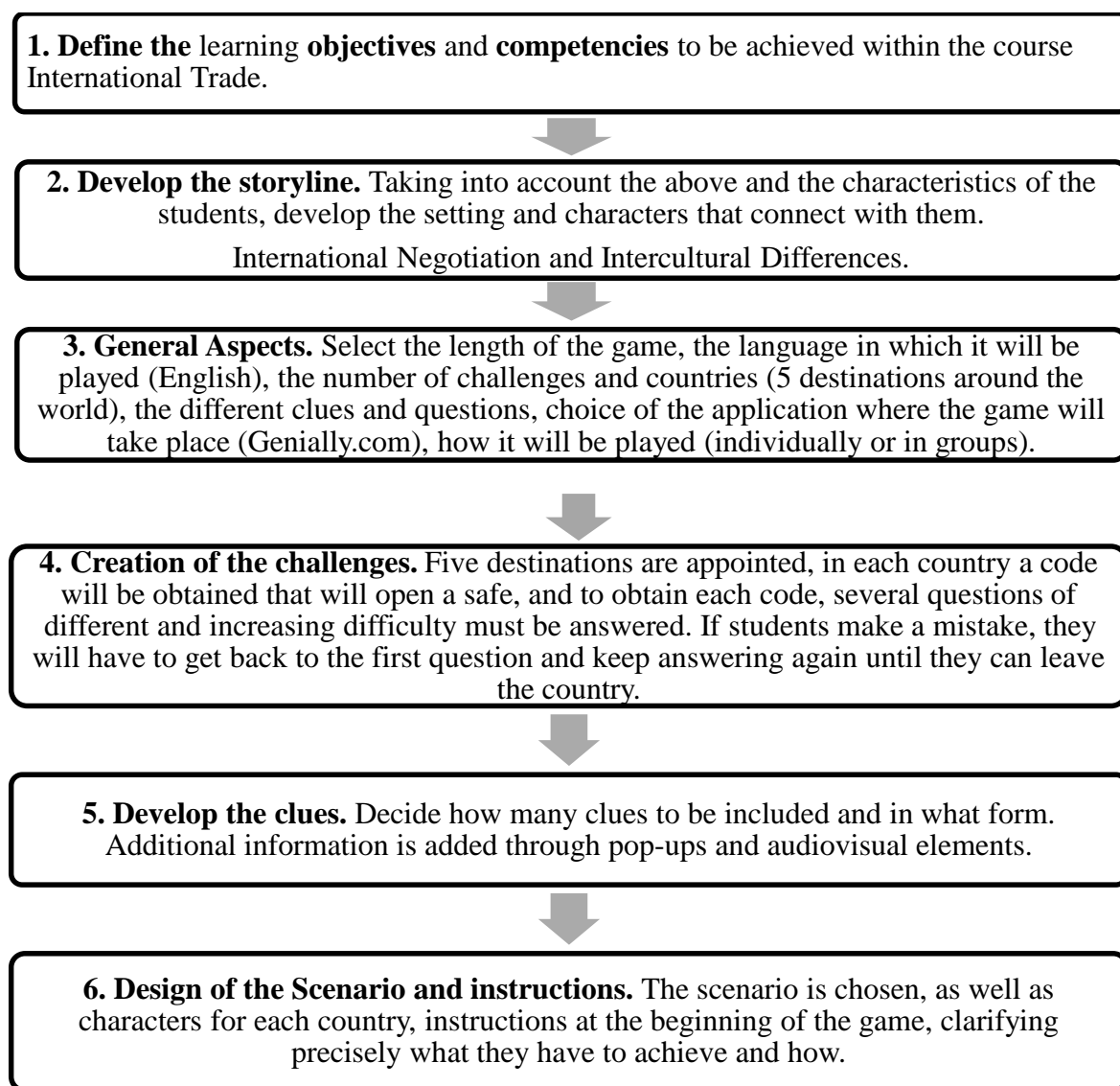
METHODOLOGY

Our research adopts a mixed methodological approach, combining quantitative and qualitative elements, to explore the effectiveness of Escape Rooms as a learning tool in distance higher education (Creamer, 2018; Shannon-Baker, 2015). This approach, which has proven effective in higher education research (Stupnisky et al., 2014; Vogelsang et al., 2020), allows for a richer and more nuanced understanding of the learning experience, combining the objectivity of quantitative data with the depth of qualitative data (McCrudden et al., 2019; Tobi & Kampen, 2018; Gobble, 2018). For the quantitative approach, numerical data were collected and analysed through surveys and statistical analysis. For the qualitative approach, direct observations were conducted and textual data were collected through interviews and group discussions.

The study was divided into two phases. In the first phase, the material was prepared and the Escape Room was created based on the experience of Salvador-Gómez et al. (2022). In terms of course typology, the methodology is especially relevant in those that have a complex and multidimensional nature, in this case the study focused on intercultural differences between countries when negotiating. To this end, an exhaustive literature review was carried out to document the behaviour of certain countries, avoiding hackneyed clichés. Finally, five countries were selected: Mexico, Brazil, Spain, Saudi Arabia and Japan, for their peculiarities and exoticism. The choice of these destinations is justified because they represent a wide range of cultures and traditions, providing a rich context for exploring intercultural differences in negotiation. This cultural diversity can help students develop a greater awareness and understanding of cultural differences, which is essential in an increasingly globalised

world. In addition, these countries also offer a good geographical representation, covering North America, South America, Europe, the Middle East and Asia. This broad geographical representation can help students develop a more global perspective and better understand the differences and similarities between different regions of the world. In summary, the inclusion of these five countries in the Escape Room is justified by their cultural diversity, relevance to distance higher education, quirks and exoticism, and geographical representation. For each destination, interactive questions and clues were designed, allowing students to interact with various audio-visual elements. This student-centred design fostered active and autonomous learning. Figure 1 below details the process of creating the Escape Room and the different phases into which it was divided.

Figure 1
Stages in the development of the Escape Room



Source: compiled by authors based on Salvador-Gómez et al. (2022, pp. 17-19).

Once the Escape Room was created, it was tested with a control group of 20 students, from the Master's Degree in International Negotiation from the University of Avignon, with different nationalities, during the 2022-23 academic year. Throughout this phase, a direct observation was carried out, where interaction among students and their collaboration with each other to solve the questions were analyzed. Based on this observation, their comments were collected to improve the learning experience, noting down the following points: number of codes obtained, time to complete the game and relevance of teamwork for the achievement of the objectives. Students also participated in a self-assessment process, reflecting on their own learning and performance after completing the Escape Room. This feedback was used to improve the implementation in the subsequent phase.

The second stage consisted of improving the Escape Room based on the information obtained through the analysis developed in Avignon and its translation into Spanish, thus generating two Escape Rooms. A single questionnaire was created in English and Spanish through Google Forms, to collect student feedback on the experience, and enclosed in the virtual Escape Rooms developed with Genially. Finally, we disseminated these Escape Rooms through the students' virtual campus of the Catholic University of Murcia, within the Marketing and Business area in the 2022-23 academic year and to an external control group.

The virtual Escape Room was designed using an application called Genially (Jiménez et al., 2020), promoting active and student-centered learning. Participants had to travel to 5 countries and solve 3 questions in each destination; also, within the Escape Room clues were included through dropdowns. If the player made a mistake, the game would return to the starting point of the previously selected destination, until the correct answer was provided, and consequently obtaining one of the necessary codes that would allow them to open the safe. Once the code was obtained, the player could then travel to the next destination. Finally, the student who obtained all the codes from the 5 destinations and placed them in the correct order could open the safe and finally complete the survey.

To collect the data, we used two surveys designed to measure Attention, Interest, Desire, and Action (AIDA), one for the students and one for the control group, both based on the survey conducted by Wei and Lu (2013). The items corresponding to the AIDA model, in five-point Likert format, were 12 in total, three for each phase of the model, to which a section called "Outcomes" was added, assessing their experience with the game. The difference between the questionnaires for students within the study and the control group is due to the control questions, since we needed more sociodemographic data from the control group, as it was randomly created through responses on Social Networks.

In the sample, therefore, there are responses from very different geographical areas. The majority, 57%, come from Spain (mainly due to the group of university students), but 30.7% are from Latin America, 5% are of other European nationalities (French, Dutch, Italian) and the remaining 7.1% come from Asia, Africa or the USA. The majority of respondents are between 18 and 23 years old (70%), so they are digital natives. Regarding the education of the respondents, most of them currently study for higher education degrees (70.3%), 16.4% have an undergraduate or vocational training certificate and 13.3% have a postgraduate degree.

To process and analyze the information collected, we used Excel and IBM SPSS statistical software for Microsoft V.23. Our analysis focused on understanding how students interact with a virtual Escape Room and how it can be used as a learning tool. This approach allowed us to collect both quantitative and qualitative data, providing a complete picture of the effectiveness of our methodology.

To process the quantitative data: first, the psychometric properties of the measurement scales of the AIDA model are tested (reliability in terms of internal consistency through Cronbach's Alpha coefficient and its dimensionality through principal component analysis). Next, the average variables of each of the components of the model are constructed and descriptive statistics are calculated. Finally, mean difference tests are performed, taking into account whether or not there is normality of the variables, according to gender, age and type of education.

To measure the effectiveness of the Escape Room, we aim to check the usefulness of this activity in improving the teaching-learning process in the future. This will be done by comparing the results obtained by the students in the mid-term exam, prior to the Escape Room, and the final exam; thus, measuring whether the experience has facilitated the assimilation of content. In order to anticipate the possible results of this part of the process, given that it was necessary to wait for the final exam, it was decided to include in the questionnaire a section about results, where the students expressed their opinion on their experience of use.

RESULTS

This section describes the results obtained from the empirical study carried out through the survey distributed among the Escape Room participants, as described above in the methodology.

With regard to the measurement scales of the AIDA model, the following results were obtained as shown in Table 1.

Table 1
Validation of the measurement scales of the AIDA model

Variables	Properties of the scale
Attention	Cronbach's Alpha = 0.935 Factorial = 1 factor Variance explained = 88.511% Sig. Bartlett = 0.000 KMO = 0.763
Interest	Cronbach's Alpha = 0.940 Factorial = 1 factor Variance explained = 86.350% Sig. Bartlett = 0.000 KMO = 0.765
Desire	Cronbach's Alpha = 0.897 Factorial = 1 factor Variance explained = 82.994% Sig. Bartlett = 0.000 KMO = 0.728

Variables	Properties of the scale
Action	Cronbach's Alpha = 0.928 Factorial = 1 factor Variance explained = 87.450% Sig. Bartlett = 0.000 KMO = 0.760

Source: prepared by authors.

As shown in Table 1, all the scales meet the requirements: alphas above 0.7, recommended for exploratory studies (Nunnally, 1967; Hair et al. 2006). In addition, the concept validity, performed by means of principal component factor analysis, yields very good results; namely, unidimensionality of the three composite scales of the AIDA model; low determinant of the correlation matrix; Bartlett's test of sphericity with significance under 0.05; KMO (Kaiser-Meyer-Olkin Index) over or equal to 0.50; and diagonal of the anti-image correlation matrix with values greater than 0.5 (Pérez & Medrano, 2010).

Below we show the descriptive results of the variables that integrate the AIDA model, both of its individual items and of the global variable (Table 2).

Table 2
Descriptive statistics

	N	Minimum	Maximum	Mean	Standard deviation
A1	98	1.00	5.00	4.1735	.97416
A2	98	1.00	5.00	4.0204	1.08390
A3	98	1.00	5.00	4.1224	1.03809
ATTENTION	98	1.00	5.00	4.1054	.97106
I1	98	1.00	5.00	4.1224	.99758
I2	98	1.00	5.00	4.1531	.94544
I3	98	1.00	5.00	4.1122	.99362
INTEREST	98	1.00	5.00	4.1293	.92519
D1	98	1.00	5.00	4.1735	.90844
D2	98	1.00	5.00	4.2551	.86527
D3	98	1.00	5.00	4.2449	.88587
DESIRE	98	1.33	5.00	4.2245	.80772
AC1	98	1.00	5.00	4.2449	.88587
AC2	98	1.00	5.00	4.0816	1.02216
AC3	98	1.00	5.00	4.1429	1.03545
ACTION	98	1.00	5.00	4.1565	.91719
N valid (according to list)	98				

Source: prepared by authors.

As can be seen in Table 3, the results are very favorable. In all individual items, as well as in the global scales, the mean is higher than 4 and there are no very large standard deviations. This means that most of the respondents have shown great

attention in the activity (mean = 4.1054; Dev. = .97106); great interest (mean = 4.1293; Dev. = .92519); great desire (mean = 4.2245; Dev. = .88587) and very positive action (mean = 4.1565; Dev. = .91719).

Next, the difference in means was calculated as a function of the independent variables, i.e., gender, age, and type of studies. Results are shown in the following tables (Tables 3 to 6). Since the dependent variables do not show a normal distribution (according to the Kolmogorow-Smirnov test), nonparametric tests were used: the Mann Whitney U test in the case of comparing two groups and the Kruskal-Wallis test in the case of comparing three or more groups.

In the sample, composed of 34 men and 64 women, descriptive statistics show that attention varies between men and women. Specifically, women show an average range of attention of 53.80, while men show an average range of 41.40. The Mann-Whitney U test yields a U value of 812.500 and a Z value of -2.116, with a significance of 0.034 (Table 3). This indicates that there is some statistically significant difference in attention between males and females, which supports the descriptive observation. As for interest, some differences between men and women can also be seen, as reflected in Table 3, where the significance is 0.006 in the Mann-Whitney U test. In the case of desire and action, on the other hand, no significant differences are found.

Table 3
Mann-Whitney U test – Gender-AIDA

Grouping variable: GENDER	ATTENTION	INTEREST	DESIRE	ACTION
Mann-Whitney U	812.500	729.000	841.000	942.500
Wilcoxon W	1407.500	1324.000	1436.000	1537.500
Z	-2.116	-2.764	-1.900	-1.121
Asymptotic Sig. (2-sided)	.034	.006	.057	.262

Source: prepared by authors.

44% percent of the respondents are aged 21 years or younger, 44% are between 29 and 34 years old, and the rest are older than 35 years old. The average ranges of attention vary from 43.25 to 69.65, indicating that there is some variation in attention to virtual Escape Rooms among different age groups. The Kruskal-Wallis test yields a Chi-square value of 6.563 with 4 degrees of freedom and a significance of 0.161, indicating that such differences are not statistically significant in attention among the different age groups (Table 4). The same applies for interest, desire and action.

Table 4
Chi Square- Age-AIDA

Grouping variable: AGE	ATTENTION	INTEREST	DESIRE	ACTION
Chi square	6.563	8.601	7.096	10.424
d.f.	4	4	4	4
Asymptotic Sig.	.161	.072	.131	.034

Source: prepared by authors.

Regarding the type of training, 15.3% of the respondents have followed or are following some type of online training, while 84.7% have received it face-to-face. In this case, no significant differences are observed between the two groups in either case (Table 5).

Table 5
Mann-Whitney U test – Type of training-AIDA

Grouping variable: TYPE OF TRAINING	ATTENTION	INTEREST	DESIRE	ACTION
Mann-Whitney U	431.500	529.000	499.500	526.500
Wilcoxon W	3917.500	4015.000	3985.500	4012.500
Z	-1.940	-.952	-1.251	-.978
Asymptotic Sig. (2-sided)	.052	.341	.211	.328
Exact Sig. (2-sided)	.052	.346	.214	.333
Exact Sig. (1-sided)	.025	.173	.107	.168
Point probability	.000	.001	.001	.004

Source: prepared by authors.

As already mentioned, the total sample is integrated by the respondents of the survey carried out on the UCAM students and another control sample made up of those who responded through social networks in a totally online manner. By comparing means, it can be seen that the distribution of the factors of Attention, Interest, Desire and Action is the same between the two groups (Table 6).

Table 6
Mann-Whitney U test – Groups (face-to-face, distance)-AIDA

Null hypothesis	Test	Sig.
The distribution of ATTENTION is the same in the 2 groups.	Mann-Whitney U test	.097
The distribution of INTEREST is the same in the 2 groups.	Mann-Whitney U test	.066
The distribution of DESIRE is the same in the 2 groups.	Mann-Whitney U test	.107
The distribution of ACTION is the same in the 2 groups.	Mann-Whitney U test	.115

Source: prepared by authors.

Therefore, it seems reasonable to conclude that virtual Escape Rooms are an attractive and versatile learning tool that can be effective in engaging a broad typology of learners. These findings provide strong support for the use of virtual Escape Rooms in distance education.

Finally, from the qualitative analysis conducted with the students and control group, the following emerged: first, the majority managed to successfully complete the Escape Rooms by getting all 5 codes of the game. Secondly, the majority of the respondents were of the opinion that the time to complete the activity was sufficient

and all of them emphasized that working in a team was a help/advantage to successfully complete the game. And thirdly, all agree that it is a useful tool for online teaching, which is interesting, since 40.8% of the respondents have followed or are following some type of online training.

DISCUSSION

This paper contributes to the existing literature on gamification in distance education, specifically through the implementation of virtual Escape Rooms. Findings support the increasing evidence that gamification strategies can improve student motivation and engagement, as claimed by authors such as Manzano-León, Camacho-Lazarraga et al. (2021) and Hamari et al. (2016).

The results of this study provide valuable insight into how students perceive virtual Escape Rooms in a distance learning environment. The use of robust statistical techniques, including testing the psychometric properties of the measurement scales and conducting Mann-Whitney and Kruskal-Wallis U-tests, reinforces the validity of the findings (McCrudden et al., 2019).

In addition, the Escape Room design process is presented, additionally disclosing how it was improved through feedback from Avignon students. As Salvador-Gomez et al. (2022) and Deterding et al. (2011) have pointed out, the effectiveness of gamification is highly dependent on its proper planning and development.

Overall, results indicate that most students find virtual Escape Rooms motivating, which is in line with available literature suggesting that gamification can improve student motivation and engagement (Hanus & Fox, 2015).

These findings have important implications for educational practice and distance education theory. In practical terms, they suggest that virtual Escape Rooms can be an effective tool for enhancing motivation and the learning experience in distance education. Educators may consider incorporating virtual Escape Rooms into their distance education courses to provide a more active and student-centered learning experience (Area-Moreira, 2018).

However, as Ouariachi and Wim (2020) and Kapp (2012) have pointed out, there is still much we do not know about how these strategies can be used effectively in distance education. Therefore, more research is needed to explore how virtual Escape Rooms can be optimally designed and implemented in different educational contexts.

For future research, it would be useful to replicate this study with a larger and more diverse sample of students. It would also be interesting to further explore how different elements of virtual Escape Rooms (e.g., riddle difficulty, room theme) may affect student motivation and engagement. In addition, longitudinal studies could be conducted to examine the long-term effects of virtual Escape Rooms on motivation and performance of distance learners.

In theoretical terms, these results contribute to our understanding of how gamification strategies can be used in distance education. In particular, they provide empirical evidence of the applicability of the AIDA model in this context, which is an area that has received little attention in the existing literature (Shala, 2020; Polk, 2018).

Our findings adhere to the widening literature on gamification in distance education. Although we found no significant differences in interest according to age

and type of instruction, this does not mean that virtual Escape Rooms are ineffective as a learning tool. In fact, our findings suggest that virtual Escape Rooms can be equally engaging for a broad typology of learners, making them a versatile and accessible learning tool. These are in line with previous studies that have found that gamification can improve student motivation and engagement in distance education (Castillo-Mora et al., 2022; Manzano-León, Aguilar-Parra et al., 2021; Zichermann & Cunningham, 2011; Hanus & Fox, 2015).

However, not everything is advantageous in the usage of Escape Room. The use of this tool can involve a great investment of time for the teacher (Markopoulus et al. 2015), so it would also be necessary to analyze the cost-benefit that its use entails for the development of the teaching-learning process.

CONCLUSIONS

In summary, this study found that most students perceive virtual Escape Rooms as a motivating activity in a distance learning environment. These findings support the existing literature on gamification in education and provide additional evidence of the applicability of the AIDA model in this context.

The studies conducted revealed relevant findings. In terms of interest according to age and type of instruction, we found no significant differences. This suggests that age and type of training do not influence students' interest in virtual Escape Rooms. In practical terms, this means that virtual Escape Rooms can be equally appealing to students of different ages and types of instruction.

This study contributes to the existing literature by exploring an area that has so far received little attention: the application of the AIDA model in distance higher education. Through this study, we have demonstrated that virtual Escape Rooms can be an effective tool to enhance student motivation in distance education.

Finally, we recommend educators consider incorporating virtual Escape Rooms into their distance education courses. We also urge researchers to continue to explore this area and to deepen our understanding of how gamification strategies can be used effectively in distance education.

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ANNEX

Figure 1

Front page of the Escape Room in Spanish and English



Figure 2

Missions to be completed by the students in order to get the code for the safe



Figure 3
Introduction to the destination Mexico in English



Figure 4
Question from the destination Brazil in Spanish

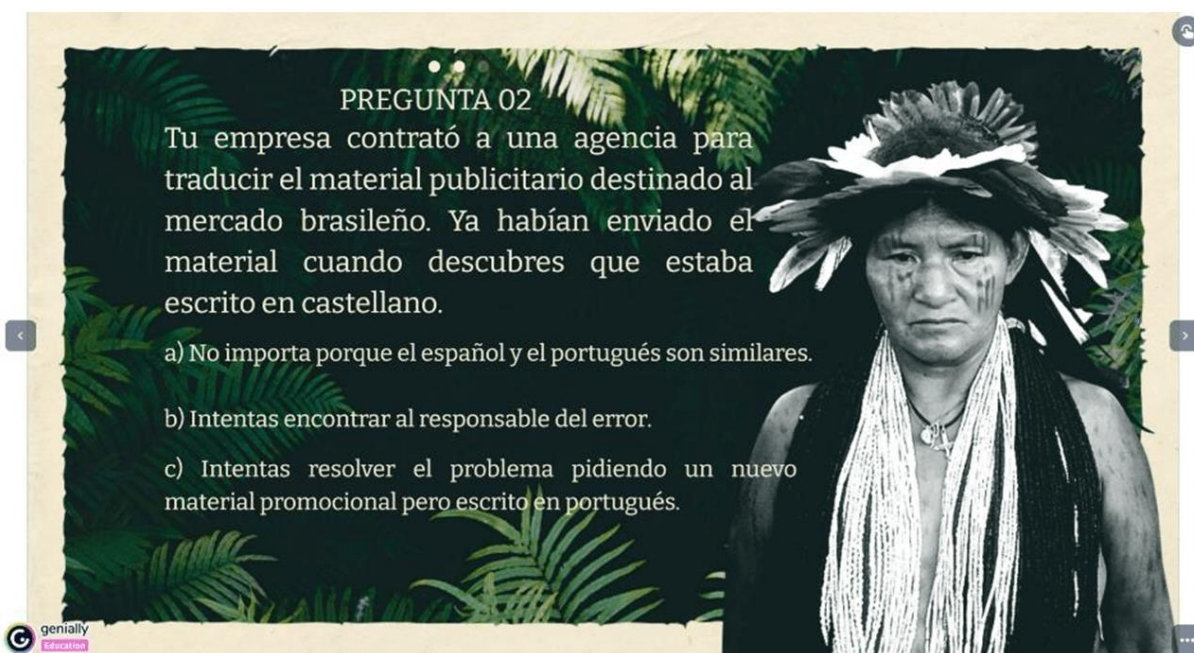


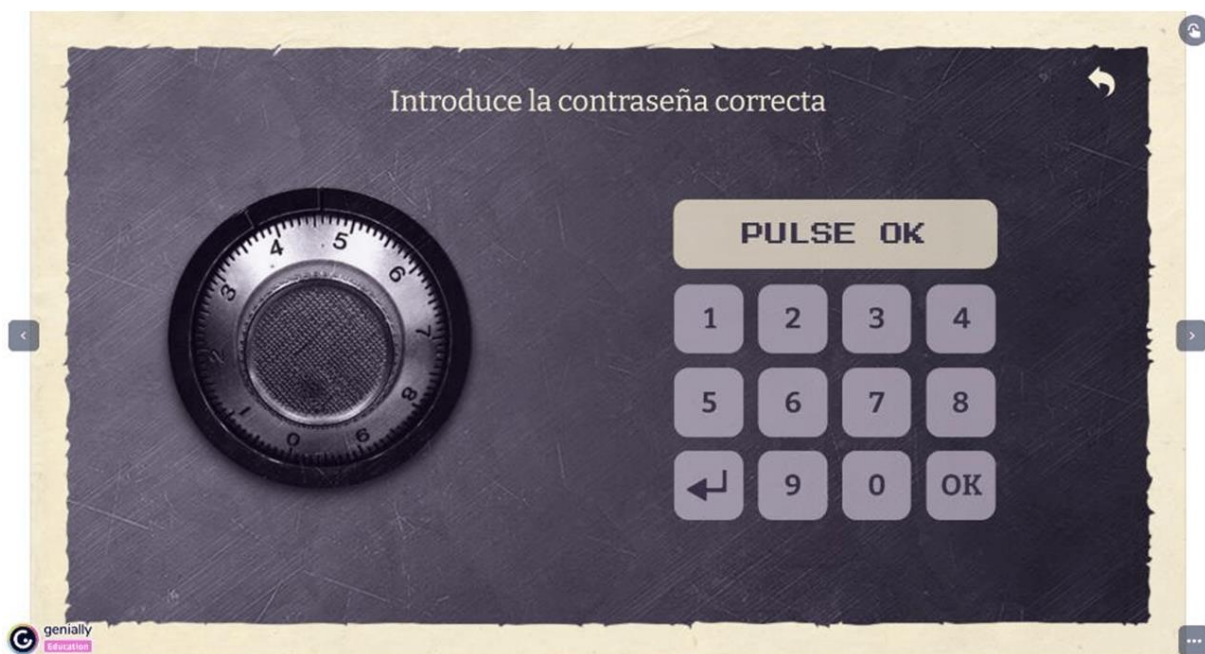
Figure 5

Achievement of the code after fulfilling the challenges of the destination



Figure 6

Safe



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