

The Courtesy of Spain: Theater for the New Generations

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Abstract—Educational video games are increasingly present in the classroom. While their success as a learning tool has been demonstrated in technical fields, they have been little used in the arts. Plays, for example, would be excellent subjects for video games, as they are similar in terms of design and narrative. However, few video games are based on plays, and, of those that have been created, their effectiveness has yet to be proven. This material is limited due to the difficulty of the narrative change, distancing a play, which is linear—without interactivity—from a video game, in which the plot varies to allow interaction. This article details the creation of a video game as an interest-raising tool, based on the work of Lope de Vega’s *The Courtesy of Spain*, in collaboration with the National Company of Classical Theater (CNTC). CNTC’s main objective is to engage Spain’s youth in classical theater, increasing their motivation and desire to learn more. This project includes an experiment in a school in Madrid with 154 students, between 9 and 11 years. The experiment indicates that a video game based on a play not only stimulates interest in young people, but also helps broader learning processes.

Index Terms—Educational video games, theatre, e-Learning, serious games, technology.

I. INTRODUCTION

NEW technologies are ubiquitous in the day-to-day of present society, with younger generations coming to be known as “digital natives” [1]. However, the same can not be said about the Spanish educational environment. The current system has remained unchanged for generations. It provides an education based on the use of paper and pen, encouraging rote memorization.

Year after year, academic performance studies reveal that students are performing consistently worse than previously, indicating school failure [2]. The education system is unappealing for many students, who prefer to spend their free time

making use of the various technologies available [3]. The education system needs to be updated through the incorporation of new technologies as classroom tools.

Among these technologies, there is one that is unparalleled in terms of effectiveness in the classroom: video games. There are numerous studies that have scientifically demonstrated how video games are beneficial in different aspects [4]. They can help improve their users’ abilities [5] as their multitasking skills [6], help individuals with developmental disorders [7] and people of advanced age [8] among others.

When a video game is well developed and instructionally oriented, it is an effective learning tool [9], [10]. They have been shown to function in many fields of education, such as mathematics [11], [12], computer science [13], social sciences [14], and geography [15].

However, most applications of educational video games are focused on areas known as STEM [16] (science, math, technology, and engineering). The aim of this project is to add the arts and humanities to this equation, making it STEAM, where A refers to Arts. The project described in this article applies to that “A”, as it brings theater to students through a video game.

For a video game to be applicable in the STEAM framework, it must teach art. In the case of this video game, it is based on a play. It incorporates the many aspects that surround a play: scenery, props, costumes, and, above all, narrative. To develop the latter correctly, developers must apply narrative techniques that logically adapt the original format of a classic play into a video game. In this process, both the visual and the sound elements are very important. Combining these elements, developers are able to represent the play in the most authentic way possible.

Many students encounter plays through school field trips, where they are forced to complete an assessment on what they have seen. Consequently, students perceive theater as a scholastic obligation rather than a cultural and leisure activity. This perhaps contributes to the noticeable decrease in young audience members, which has made theater an activity enjoyed by a minority of the population [17]. This situation puts forward a question: is the current education system damaging to theater?

Applying STEAM techniques can solve this problem, since video games can be more than teaching tools. Different studies indicate that they can be effective in increasing students’ interest in learning [13], [18] and their motivation to learn [9], [19]–[22]. We will refer to these types of games as *awareness video games*.

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When developing an awareness video game, the balance between motivation and fun must be taken into account. An awareness video game should seek to expose students to a specific subject. However, if its development only focuses on that, it runs the risk of not being fun. In the same way, if it develops as a primarily fun video game, it loses its educational value. The article by Iglesias *et al.* [23] offers a series of techniques to transform the script of a play into a video game of sensitization, and it also explains how to give personality to different characters through Stanislavsky's method of action [24]. Using these techniques, a sensitization video game was developed based on the play "The Courtesy of Spain" by playwright Lope de Vega, seeking to show the funniest side of classic theater to youth while raising their interest in Lope de Vega and his works.

Children learn best when they are motivated by interest. The more interesting something is, the easier it becomes to learn [25], [26]. Therefore, the main objective of this video game is to increase interest in classical theater. The second objective of the video game is to familiarize students with the plot lines of the play.

To test the effectiveness of the game, an experiment was conducted in a school in the Community of Madrid during the month of December 2015, in which the students played the video game. This paper details the experiment's results.

This paper has been structured as follows: Section II discusses the video game that has been developed as a research tool. Section III explains the experiment performed to obtain the necessary data for further analysis and results. Section IV is results analysis, and section V discusses the results and develops the conclusions obtained during the experiment.

II. VIDEO GAME AND RESEARCH QUESTIONS

Converting a theatre play into a motivational video game is not trivial, especially if the main objective is to design a video game that entertains and, at the same time, produces interest. The first complication is that the storyline that is going to be narrated, a story firstly created to be represented or read, must be transferred to a video game to be played.

Currently there are a lot of theatre plays. In many cases, the public can interact directly in the play, changing the plot. However, this video game is based on a classic theatre play of the Spanish Golden Century (17th), when all plays had a linear plot, meaning, the actors represented the play on stage while the public was watching without participating in the play. Unlike this, a funny video game must move away from the linearity and offer the players the possibility to participate and be part of the narrated storyline.

The second complication is the complexity of designing a sensitization video game and to make it funny. If we only focus on designing a video game like an educative tool, forgetting the main purpose of every video game, which is to have fun playing it, we can create a tool that despite being very motivational does not succeed because it is boring. On the other hand, if we only focus on the fun, without paying attention to the motivational part, it is possible that the final product does not work like a sensitization tool and does not

reach the objective. It is important to design a sensitization video game keeping in mind that, like a video game, must be as funniest as possible, and as a motivational tool, it must teach the main theme that is treated, achieving the sensitization tool that teaches without the player having the feeling of studying.

Finally, the most important purpose of a video game is to give a spark of humanity to the play's characters, giving to the players the feeling that the video game's characters are real actors representing the theatre play. And, at this point, definitely, theatre has something to teach.

Considering these complications, some researchers developed a motivational video game using the Unity engine as a tool for their experiment. The video was based on the play "The Courtesy of Spain", written by the Spanish playwright Lope de Vega. The video game was developed with the collaboration of the Spanish Classical Theater National Company (CNTC) and it was based on the staging represented in the Matadero Theater in Madrid during 2015.

The play could be described as a "road movie" of the 17th century, which narrates the life of a Spanish knight known as Don Juan, who is coming back to Spain after having been defeated in the Battle of Flanders and having lost all of his money. On his way back home, he meets some new characters and will have to overcome a lot of challenges, always adhering to the most important value for the Spanish knights of his time, courtesy. That means, this is a propagandistic theatrical play, as American films that publicize the marvels of its military force.

The first thing that must be clear before starting to develop a video game or a motivational tool is the main goal. In this case, the video game has two clear goals: 1) to motivate children about the classical theatre, because it is necessary that they learn about it and have the desire to attend plays, since it is gradually becoming a show of minorities, and 2) to teach the plot of "The Courtesy of Spain" by Lope de Vega. With these goals in mind, the process of designing the videogame can begin.

One of the first things to keep in mind in the previous phases of design is the target audience. Setting a target age range is key to designing and later developing a video game that works in the best possible way with the objectives set. At the beginning of the project, it was decided that the target audience for the video game would be students between 8 and 12 years old. However, during the development of the video game, the pedagogue involved in the project decided to reduce this range to 9-11. This was because they considered that a conversational adventure fits better that age range.

Researchers decided to develop an adventure video game because this genre is perfect for immersion and storytelling. The video game uses the Point & Click interaction system, a system easy to use, which has already proven itself in other research [27].

In order to effectively narrate the story of "The Courtesy of Spain", researchers studied the historical framework in which it was written, and to understand daily life in the 17th century. With the collaboration of the CNTC in this project, they allowed the researchers to attend rehearsals of the play, and introduced us to the members of the artistic team. As shown



Fig. 3. Money and courtesy.

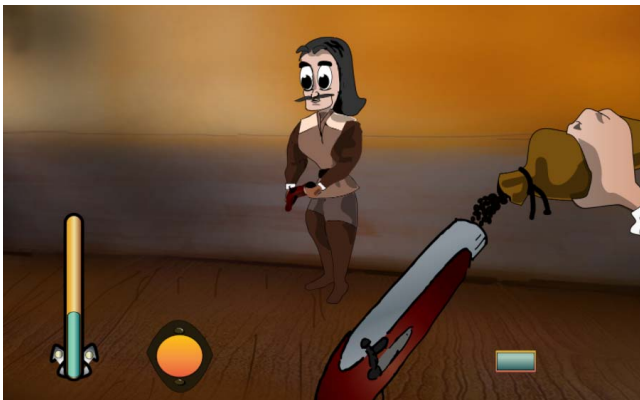


Fig. 4. Minigame - duel.

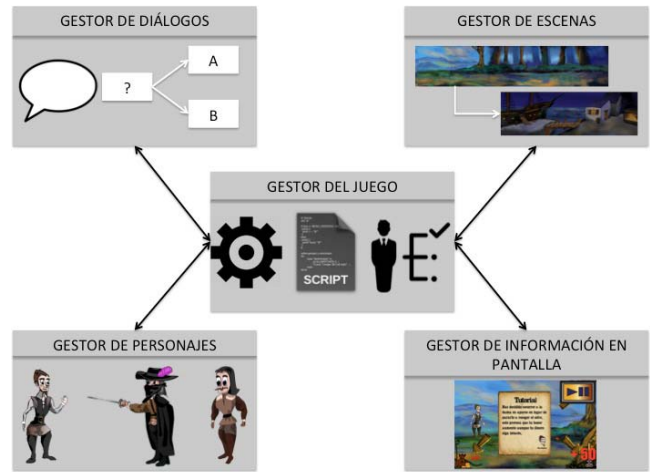


Fig. 5. Video game architecture.

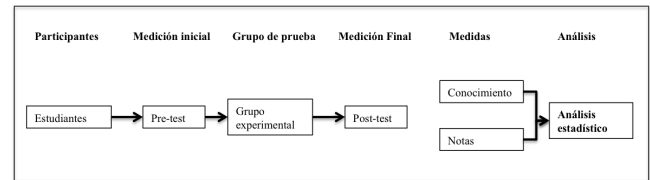


Fig. 6. Quasi-experimental design.



Fig. 7. Likert 7 scale with emoticons.

3. The *character manager* deals with both the main character and the other characters NPCs (non-player characters).
4. The *screen information* manager is responsible for displaying the updated information of the main character, modifying the variables of courtesy and money.
5. Finally, as the central module is the game manager, who acts as a mediator between the rest of the managers, performing the necessary operations for the proper functioning of the game.

The game, developed with Unity3D, is fully available for free download on different platforms. In addition, the game is open source, and its code is available on GitHub, so that anyone can download and modify, consult or see everything they want.¹

Once the game was over, it was time to conduct an experiment, in order to know if the developed videogame was able to motivate young people to go to the theater, and above all that they played it and had fun.

The main objective of this experiment is to verify the effectiveness of these videogames as a motivation and learning tool about classical theater for young people while having fun.

Therefore, the research questions are the following:

RQ1: Can the video game of “The Courtesy of Spain” motivate young people to go to the theater?

RQ2: Can the video game of “La Courtesy of Spain” teach players the plot of the homonymous play?

III. EXPERIMENT

The following outlines the steps of the experiment and its features.

A. Participants

The experiment was carried out with 154 students from the Benito Pérez Galdós school in Móstoles, Madrid. The participants’ ages ranged from 9 to 12 years old. 55,2% of the participants were boys, while the remaining 44,8% were girls. In terms of gender and age, the sample is representative of the student population in the Autonomous Community of Madrid [28].

From the total 154 participants in the experiment, the results obtained from the 12-year-old students were rejected, because the students were not in the video game’s target age range. After removing these 9 students, the total number of participants was 145.

One of the first steps, prior to the experiment, was communicating with the school to determine the students’ familiarity with the play’s plot. The play had been performed in Madrid in 2015, and the school may have taken the students on a field trip to see the performance. The school management

¹<http://cortesia.e-ucm.es/>

confirmed students did not know the play. Nonetheless, and to avoid bias on the experiment, the initial questionnaire asked students directly if they knew the play. 97,2% of the participants indicated that they did not know the plot before the experiment. 4 participants of the 145 did confirm that they knew it in advance. They were also eliminated, as the purpose of this experiment was to determine if students' interest in the play increased and to measure how much they learned. Ultimately, we had 141 research subjects.

Since differences in use of new technologies could introduce errors in the experiment, we ensured that each subject was able to use the devices

B. Experimental Design

The experiment has a quasi-experimental design, which consists of three phases. In order to be able to compare results between each phase, an identification number was assigned to each participant. The identification number allowed results to remain anonymous, encouraging the subjects to speak freely in their answers.

The first phase consisted of a pre-test or "before" questionnaire. Students had 5 minutes to complete the test. Each participant had to write their identification code, gender and age. The questionnaire includes questions to measure prior knowledge of the play's plot and their motivation to attend the theater.

After finishing the pre-test, students were introduced to the game. The game had been installed in the different devices made available by the school. Each participant received a device with the game ready to play. The video game is designed to be finished in one class period of 50 minutes. In order to ensure maximum immersion and comprehension, students used headsets, which canceled interference from other students' games.

After the experiment, each participant received the post-test, a questionnaire to be filled out in 5 minutes maximum. If, for some reason, students had not yet have finish the round 10 minutes before the experiment's conclusion, the test was administered as they finished, and the post-test would be given after. All subjects finished the round with plenty of time to fill in the second questionnaire. The full description of both questionnaires is included in the Instruments section (see section III.C).

Once the questionnaires were finished, participants could continue to play the video game until the end of the allotted time for the experiment.

C. Instruments

In order to answer the research questions, two questionnaires were developed: a pre-test, to be answered before the experiment, and the post-test, to be completed afterwards. The video game is detailed in the video game section and research questions (see section II).

The first part of the pre-test provides a box for students to put their identification code, which was distributed on a sticker by the teachers before starting the test. With this code the researchers could then compare the results between the

TABLE I
CORRELATION OF PAIRED SAMPLES

<i>N</i>	<i>Correlation</i>	<i>Sig.</i>
141	0.687	0.000

pre-test and the post-test. The questionnaire then requested social-demographic information about the participants. The second part of the questionnaire measured prior knowledge about the play's plot (see questions 1) and their interest in theater in general and in this plot in particular (see questions 2). The questions used to measure participants' interest in theater follow a Likert 7 scale.

The post-test measured how much the students have learned about the play's plot and their motivation to go to the theater after the experiment. In order to measure their learning, 8 questions ranked different difficulty levels with 4 possible answers, when only one of them is correct (see question 3). Once again, this followed a 7-point Likert scale (see question 4). In the second part of the questionnaire, students were instructed to assess the game (see question 5) and the experience (see question 6), to indicate if the experience had been satisfactory for the students and if future experiments should be performed similarly. To understand students' opinions, various questions were asked using a 7 point Likert scale.

It should be mentioned that, because the age of the target audience is young and their reading skills could be poor, all the questions with a 7 point Likert scale were represented, in addition to numerically, with whatsapp emoticons (symbols with which most of them are familiarized).

IV. RESULTS

In this section, we analyze the data resulting from the experiment detailed in the experiment section (see section III).

A. Interest on the Theater

To answer the research question **RQ1** we proceeded to analyze the interest that the video game aroused in students for attending the play. This analysis is based on the results obtained in the questions on motivation. In order to see whether the results were statistically significant, we performed a T-Student test of related samples since we did not consider any control group in the test. First, it gave us the results of correlates of related samples, that is to say, data from a single group, without a control group. This test gave us an analysis of the relationship between the groups and is useful to corroborate that, indeed, we are before related samples. When we obtain a significance lower than 0.05, we can assume that we are facing this type of samples and that, therefore, we can proceed to the analysis of the test of t, being assured that this test is valid for this sample.

In Table 2 we can see the t test with an alpha of 0.05 (95% significance). In this test, we can see that the mean difference is -2.05 and that it is within the confidence interval, located between -2.662 and -1.437 . Therefore, we assume that the

TABLE II
TEST OF PAIRED SAMPLES

Avg	95% Confidence interval		T	GL	Sig(bi)
	Lower	Upper			
-2.05	-2.662	-1.437	-6.619	140	0.000

*p<0.05

TABLE III
MOTIVATION FOR GOING TO THE THEATER

Descriptives	Motivation		
	N	Avg	Std. deviation
Pre-Video game	141	4.96	1.182
Post-Video game	141	5.47	1.140

TABLE IV
KNOWLEDGE ACQUIRED ABOUT THE PLAY

Descriptives	Knowledge		
	N	Avg	Std. deviation
Post-Video game	141	6.07	1.402

means are different. Finally, we can observe the t-statistic (-6,619) and its significance (0.000). Since the significance is less than 0.025 (0.5 / 2 since the contrast is bilateral) we can reject the null hypothesis of equality of means, and, therefore, assume statistically significant results.

Knowing there are statistically significant results, we proceeded to analyze the descriptive. In the following table (see table 3), we can observe the means resulting from all the answers obtained in both the pre-test and the post-test. An increase between the pre-test (mean of 4.96 out of a total of 7 maximum points) and the post-test (mean of 5.47 out of 7 maximum points) can be observed. The standard deviation can be observed very similar in both the pre-test (1.1820) and the post-test (1,140).

B. Knowledge About the Plot

To answer question **RQ2**, we must study the knowledge acquired by students about the argument of the play. One of the starting points of this experiment is that the students had not seen the play represented in the game. With this as a basis, we assumed that the students did not know anything about the argument. As can be seen in the table below (see table 4), the students obtained an average of 6.07 correct answers out of a total of 8 possible. The standard deviation (1.402) indicates that the fluctuation of correct responses per student is low.

C. Assessment of the Game and Experience

In order to evaluate the students' experience in the experiment and the game, the data obtained were analyzed. In the first, an average of 17.04 points was obtained on a maximum

TABLE V
ASSESSMENT OF THE GAME AND EXPERIENCE

Descriptives	Video game and experience		
	N	Avg/Max	Std. deviation
Experience	141	17.04/21	4.52
Video game	141	34.16/42	5.587

of 21. In the second, an average of 36.42 out of a total of 42 was obtained.

V. DISCUSSION

This section responds to questions asked in section II.

RQ1: Will the video game "The Courtesy of Spain" motivate young people to go to the theater?

No, this fact can not be assured. In the results, we can observe a statistically significant difference between the responses given by the students in the pre-test (4.96 out of 7) before they played the video game and the post-test (5.47 out of 7) after they played a game. The experiment cannot assert that playing a game will result in the students going to the theater. However, we believe that the results are meaningful enough to establish a line of research, with longer experiments that may claim that motivation increases through video games.

The data demonstrates that the techniques used for the development and focus of the video game have been effective.

RQ2: Can the video game, "The Courtesy of Spain," teach the argument of the eponymous play's plot?

Yes, the results of this section are high, as participants marked high scores in questions relating to the play's plot. The average score was 6.07 out of 8, which is a very high score speaking in terms of classical evaluation. This point shows that marathon sessions are not necessary for students to learn. With this technique, students can effectively learn the plot of a seventeenth-century play in a 50-minute class.

With the last statistic, and as a complement to the previous answers, a high score is obtained in the evaluations on the experience and the game. The results in the field of lived experience are 17.04 with a maximum possible score of 21. In addition, in the evaluation of the game a score of 34.16 was obtained on a 42-point scale. Both results are higher than can classically be understood as approved. This shows that, in addition to teaching and motivating students in the field of classical theater, the video game was a fun and enjoyable learning experience.

VI. CONCLUSIONS

Based on the results interpreted in the discussion section (see section V), the conclusions are clearly positive. We can conclude that video games developed similarly to the one described in this article (see section II) are effective in achieving our priority objectives: 1) to arouse students' interest in art (in this case, classical theater), 2) that the student / player learns about the argument of the play and, 3) that the experience is positive and the participants have fun, like any video game objective.

It is also interesting to point out that many of the participants verified among themselves that their games had differed. They not only arrived at different endings but, due to the branching of the game, the experiences of some had been different from others. This motivated students to return to the game, and some asked how they could download the game at home.

We also want to point out the limitations of this study. Firstly, the experiment was conducted in a very specific context, that is, with students of 9-11 years old and with a video game about classical theater, which makes it difficult to generalize the results. In addition, the students performed the experiment for a short amount of time, 50 minutes, which possibly did not show all the possible effects of the video game. It would be interesting to continue this research, to develop improvements in the video game and to expose the students to the experiment for a longer amount of time, which would help to see other different and significant effects. We also intend to perform a longer term test to check the effects of the game over time. Finally, in a future experiment, we will use a control group, like the usual teacher, to be able to compare our results with those obtained in classical education.

The main future work after this research is the extension of this experiment. This will consist of the students being able to attend the actual play after playing the game. In addition to the experiment participants, a control group that has not played will be added to check for differences. With that, it will be possible to evaluate if playing the game affects participants' interest in classic theater.

Finally, we would like to point out that all the students were provided with earphones, in order to ensure they could fully hear and not be distracted. However, some students found the headphones to be uncomfortable and refused to use them. Researchers observed that students who did not use headsets were prompt to copy their classmates' actions instead of finding the best answer by themselves. This leads us to think that the sound environment can be an important factor in the immersion of players in the game world.

All the data collected, as well as the observations of the investigators, leads us to conclude that games can be a real solution to youth disinterest in theater.

ANEXO A
PRE-TEST

Questions 1 (Questions About Knowledge):

Instrucciones: Rodea con un círculo la opción correcta en cada pregunta.

1. ¿Conocías el argumento de La Cortesía de España antes del día de hoy?

Sí	No
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2. ¿Cuántas veces has ido al teatro durante el año 2015?

<input type="text"/>	Veces
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3. ¿Has ido alguna vez de excursión al teatro con la escuela?

Sí	No
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Questions 2 (Questions About Motivation):

4. Valora con un círculo cuánto te gusta el teatro.

1	2	3	4	5	6	7	

5. Valora con un círculo cuánto te apetece ir a ver una obra de teatro clásico

1	2	3	4	5	6	7	

6. Valora con un círculo cuánto te apetece ir a ver la obra "La Cortesía de España".

1	2	3	4	5	6	7	

7. Valora con un círculo cuánto te gustaría que el colegio te llevase a ver obras de teatro.

1	2	3	4	5	6	7	

ANEXO B
POST-TEST

Questions 3 (Questions About Knowledge):

Conocimiento sobre la obra

Instrucciones: Rodea con un círculo la opción correcta en cada pregunta.

1. ¿Cómo se llama el escudero de Don Juan?

Marcelo	Claudio	Mauricio	<u>Zorrilla</u>
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2. ¿Cuál es el objetivo principal del protagonista?

Ser un hombre de honor	<u>Ser un hombre rico</u>	<u>Conquistar a su escudero</u>	Ver a su hermana
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3. ¿Qué se encuentra el protagonista al llegar al bosque?

<u>Un mendigo</u>	<u>Un borracho</u>	<u>Un campesino</u>	<u>Un bandido</u>
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4. ¿Qué ocurre cuando llega Marcelo a casa de Don Juan?

Zorrilla se marcha de casa	Don Juan no le deja entrar	<u>Leonarda les invita a tomar algo</u>	Lucrecia advierte que Marcelo es su marido
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5. ¿Qué cree Lucrecia que ha hecho su marido Marcelo?

Obligarla a casarse con otro hombre	Mandar a Claudio a darla muerte	Abandonarla en un bosque	Olvidar el día de su aniversario
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6. ¿En qué ciudad vive el protagonista?

<u>Génova</u>	Toledo	Barcelona	<u>Orgaz</u>
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7. ¿De dónde viene el protagonista al empezar el juego?

De un viaje de placer	De la Guerra de Flandes	<u>De hacer negocios</u>	De navegar por el mar del norte
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8. ¿Cómo viajan nuestros protagonistas desde el bosque hasta Barcelona?

En <u>carro</u>	En <u>tren</u>	En <u>barco</u>	<u>Andando</u>
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Questions 4 (Questions About Motivation):

Motivación

En las siguientes preguntas, el icono más triste significa que no te gusta absolutamente nada y el más feliz que te gusta muchísimo.

9. Valora con un círculo cuánto te gusta el teatro

1	2	3	4	5	6	7	

10. Valora con un círculo cuánto te apetece ir a ver una obra de teatro clásico

1	2	3	4	5	6	7	

11. Valora con un círculo cuánto te apetece ir a ver la obra "La Cortesía de España"

1	2	3	4	5	6	7	

12. Valora con un círculo cuánto te gustaría que el colegio te llevase a ver obras de teatro

1	2	3	4	5	6	7	

Questions 5 (Questions About Game Evaluation):

Valoración del juego

13. Valora con un círculo cuánto te ha gustado el juego.

1	2	3	4	5	6	7	

14. Valora con un círculo los gráficos del juego.

1	2	3	4	5	6	7	

15. Valora con un círculo cuánto te ha gustado la historia narrada en el juego.

1	2	3	4	5	6	7	

16. Valora con un círculo lo divertido que te parece el **minijuego** en el que persigues al bandido. (Responde sólo si lo has jugado)

1	2	3	4	5	6	7	

17. Valora con un círculo lo divertido que te parece el **minijuego** en el que miras a través de una cerradura. (Responde sólo si lo has jugado)

1	2	3	4	5	6	7	

18. Valora con un círculo lo divertido que te parece el **minijuego** del duelo de pistolas. (Responde sólo si lo has jugado)

1	2	3	4	5	6	7	

Questions 6 (Questions about experience evaluation):

Valoración de la experiencia

22. Valora con un círculo cuánto quieres jugar al videojuego de una obra de teatro antes de ir a verla

1	2	3	4	5	6	7	

23. Valora con un círculo cuánto te ha gustado esta clase sobre La Cortesía de España

1	2	3	4	5	6	7	

24. Valora con un círculo cuánto sabes ahora sobre la obra "La Cortesía de España"

1	2	3	4	5	6	7	

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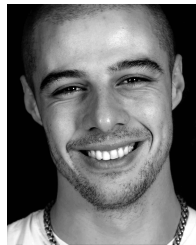
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