The effect of an educational video game on high school students’ motivation, self-efficacy and knowledge in a History course

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Abstract
The purpose of this study was to explore the effects of an educational video game on high school students’ motivation, self-efficacy and knowledge. The game tells the story of Mariano Melgar, a Peruvian thinker, patriot and hero. The authors used a quasi-experimental design and conducted pre- and post-tests to estimate the effect of the video game. The sample consisted of 67 students from two schools in Lima. The students were randomly assigned to one of two conditions: playing a video game or watching a documentary. Results show that playing the video...
game was more effective in increasing students’ knowledge, whereas watching a documentary increased demotivation and decreased self-efficacy through vicarious experience. In view of this, it is important to explore further video games’ usefulness as educational materials.

**Keywords:** motivation, self-efficacy, video games, history instruction

El efecto de un videojuego educativo en la motivación, autoeficacia y conocimiento de estudiantes de secundaria en un curso de historia

**Resumen**

El objetivo de este estudio fue explorar los efectos de un videojuego educativo en la motivación, la autoeficacia y el conocimiento de estudiantes de secundaria. El juego aborda la historia de Mariano Melgar, un intelectual y héroe peruano. Tuvo un diseño cuasi-experimental, por lo que se realizaron análisis pre-test y post-test. El experimento se realizó con 67 estudiantes de dos escuelas de Lima. Se les asignó al azar una de dos condiciones: jugar a un videojuego o ver un documental. Los resultados muestran que el videojuego fue más eficaz para incrementar el conocimiento de los estudiantes, mientras que el documental aumentó la desmotivación y disminuyó la autoeficacia mediante la experiencia vicaria. En vista de esto, resulta relevante explorar con mayor profundidad la utilidad de los videojuegos como material didáctico.

**Palabras clave:** motivación, autoeficacia, videojuegos, enseñanza de la historia

O efeito de um jogo educativo na motivação, autoeficácia e conhecimento de alunos do ensino médio em um curso de história

**Resumo**

O objetivo deste estudo foi investigar os efeitos de um videogame educativo na motivação, autoeficácia e conhecimento de alunos do ensino médio, abordando a história de Mariano Melgar, um herói intelectual e patriótico peruano. Adotou-se um desenho quase experimental, realizando pré-testes e pós-testes para avaliar o impacto do videogame. O experimento envolveu 67 alunos de duas escolas em Lima, randomizados para duas condições: jogar o videogame ou assistir a um documentário. Os resultados revelaram que o videogame foi mais eficaz para aumentar o conhecimento dos alunos, ao passo que assistir a um documentário resultou em aumento da desmotivação e redução da autoeficácia por meio da experiência vicária. Diante desses resultados, sugere-se uma exploração mais aprofundada sobre a utilidade dos videogames como ferramenta educacional.

**Palavras-chave:** motivação, autoeficácia, jogos educativos, ensino de história.
1. Introduction

1.1. Motivation and Self-efficacy in Education

In recent years, in order to innovate and support pedagogical practice, it has become common practice to incorporate Information and Communication Technologies (ICTs) in the classroom (Dolighan & Owen, 2021; Maheshwari, 2021). This suggests that ICTs can contribute to a meaningful teaching process, one which fosters a positive learning climate and autonomous motivation (Filippello et al., 2020; Reeve & Cheon, 2021; Ryan & Deci, 2020).

In this context, it is important to consider students’ motivation, and hence this study uses as a conceptual framework the Self-Determination Theory (SDT), a macro-theory of motivation. SDT views motivation as a complex concept, considering the impulses that lead someone to perform a behavior (Deci & Ryan, 2000; Herrera & Matos, 2009; Reeve, 2002). According to Deci and Ryan (2000), three types of motivation can regulate an impulse: autonomous motivation, controlled motivation, and demotivation.

Autonomous motivation refers to actions stemming from personal interest (Deci & Ryan, 2000; Ryan & Deci, 2002; Vallerand et al., 1992). In contrast, controlled motivation refers to the influence of external stimuli on performing a behavior (Deci & Ryan, 2000; Ryan & Deci 2017). In addition to these opposing impulses, SDT views demotivation as the absence of interest in achieving a goal (Ryan & Deci, 2002), a phenomenon detrimental to students’ educational outcomes (Galleguillos & Olmedo, 2019; Kaiser et al., 2020; Reeve et al., 2020). Autonomous motivation has been proven to positively influence students’ learning (Shah et al., 2021), academic performance (Lin et al., 2017), and academic self-efficacy (Ahmadi et al., 2021; Howard et al., 2021).

On the other hand, self-efficacy refers to the perception of one’s abilities to perform certain actions and produce a given result (Bandura, 1997; Bandura 2006) and has also been studied as a predictor of academic performance (Schirichian et al., 2022; Supervia & Robres, 2021; Zysberg & Schwabsky, 2021). In the academic context, self-efficacy is thus understood as the beliefs that students have about their academic skills (Li et al., 2021; Peura et al., 2021). This is also constructed from the vicarious experience of observing others (Delgado et al., 2019; Usher & Pajares, 2009); the interpretation of previous achievements, comparing them with those of others; the persuasion and social messages received from others (Hattie & Timperley, 2007; Moreta & Ocaña, 2021); and students’ evaluations of their performance influenced...
by their physiological and emotional states (Espinosa et al., 2020; Supervía & Robres, 2021).

The references above show that motivation and self-efficacy are relevant variables in education, which need to be addressed together with the use of ICTs (Calderón et al., 2020; Hanham et al., 2021; Rosli & Saleh, 2022). In particular, a relatively new trend of research focuses on the influence of video games on education (Martinez et al., 2022) and history instruction (Guerrero et al., 2021). However, there are few similar studies in Latin America and far fewer in Peru. Hence the need to address this issue to learn more about it in Peruvian classrooms.

1.2. History Teaching and Videogames

According to Peru’s Ministry of Education (MINEDU, 2016), history teaching in Peru is important for encouraging the exercise of citizenship, which allows students to consider living within a changing society. MINEDU (2016) states that the purpose of teaching history is for students to understand the relationship between the past and the present and to recognize themselves as social actors who can construct and transform the present and future. In line with this, Almagro and Cerez (2020) point out the importance of such content for national identity and collective memory.

Interaction between teachers and students must therefore be encouraged, using a participatory methodology and supported by technology (Carrasco et al., 2021), otherwise students will memorize content without reasoning or constructing new concepts (González et al., 2022). This can be seen currently in the use of technological aids in history instruction using audiovisual materials: students do not learn to take a critical view of history (Cuenca et al., 2021). In view of this, some scholars propose using video games (Evaristo et al., 2016).

Games are defined as voluntary and immersive activities that entertain users in a way that is separate from the real world (Barclay & Bowers, 2020; Cutting et al., 2020; Huang et al., 2019; Ijaz et al., 2020). All games have the following characteristics: fantasy, rules and objectives, sensory stimuli, challenge or level of difficulty, mystery in the game, interaction, and the amount of control one has over the game (Chen et al., 2021; Hügel & Davies, 2022; Maheu et al., 2018; Tsai & Tsai, 2020). These features are what foster users’ interest and can aid teaching (Los & Schweinle, 2019; Lou & Noels, 2022). Video games also appear to have various cognitive benefits for students (Abd et al., 2022; Megagianni & Kakana, 2021), as well as positive effects
on academic performance in subjects such as math and science (Cook et al., 2022; Gkora & Stathopoulou, 2022; Rosenthal & Ratan, 2022).

Furthermore, video games can also increase students’ motivation to learn and self-efficacy by creating greater interest and commitment to content presented in class (Bozgun & Baytemir, 2021; Byusa et al., 2022; Sanchez et al., 2022; Yunus et al., 2021). The use of portable consoles in the classroom also helps keep students motivated, regardless of the strategy used by the teacher (Gouseti et al., 2020; McFadyen, 2021). SDT has also studied the motivation for playing video games, and perceived autonomy and competence appear to be related to students’ enjoyment of them (Ryan et al., 2006).

Although there is evidence of the positive influence of video games on various school subjects, there is particular evidence related to their use in history teaching (Boom, 2020; Kessner & Harris, 2022; Patterson et al., 2022). This is mostly found in international studies, and there is little evidence of the use of video games on history in the classroom in Latin America. In Peru, a study by Evaristo et al. (2016) concluded that video games as a teaching aid can be a positive stimulus for teaching. Nevertheless, the study pointed to important constraints (such as the time of exposure to the stimuli), and so further research is needed to corroborate these findings.

The purpose of this study is to identify the influence of a historical video game on the academic performance, motivation, and self-efficacy of ninth-grade students. It uses a quasi-experimental design for comparing the results obtained from one group that used the video game and another that used a documentary as pedagogical material. The variables studied are expected to show greater improvement as a result of using video games.

2. Method

2.1. Participants

The sample was composed of 67 students from two schools in Lima. The students were randomly assigned to one of the two conditions of the study, class A (“Video game” condition) or class B (“Documentary” condition). In total, there were 31 girls (46.3 percent) and 36 boys (53.7 percent), aged from 13 to 16 (\(M = 14, SD = .58\)). All students were in ninth grade (third grade of secondary education).

In the first school, 23 students participated (\(M = 14.05\) years old, \(SD = .49\)) in class A (video game), nine of whom were girls, and fourteen were boys. Nineteen students participated (\(M = 13.89\) years, \(SD = .57\)) in class B (docu-
mentary), nine of whom were boys, and ten were girls. In the second school, 14 students were randomly assigned \((M = 14.07 \text{ years}, SD = .73)\) to class A (video game). Nine were boys, and five were girls. Eleven students participated \((M = 14 \text{ years}, SD = .63)\) in class B (documentary), four of whom were boys and seven were girls.

Their parents were informed of the nature of the study and agreed to their children’s participation in the study by signing an informed consent form, which explained the purpose of the research and the confidentiality of the information, and specified that students could withdraw from the study at any time.

### 2.2. Instruments

The study had a quasi-experimental cross-sectional design. The following instruments were used as measures of the effects of the video game on the variables studied.

**Classes on Mariano Melgar.** Two history lessons about Mariano Melgar were designed with the help of a history teacher. These were similar in form and content. Class A played the video game “Mariano: The Last Dream” as pedagogical material, while Class B watched the documentary “Mariano Melgar: Passion, Homeland and Poetry” (Aguirre, 2016). Both lessons were taught by senior Education students.

**Video game “Mariano: The Last Dream”**. This is a 2.5D side-scrolling Puzzle and Platform game inspired by the life of the Peruvian figure, Mariano Melgar. The player takes the role of Melgar in his last dream, moments before being shot, and must use his skills as a patriotic poet to save his beloved Silvia and his compatriots from the Horrible Night. The video game was designed and developed by Avatar Group of the Pontificia Universidad Católica del Perú (Pontifical Catholic University of Peru) for the project “Development and Validation of a multimedia software as a pedagogical tool to increase knowledge of secondary education students about the independence of Peru”. The game design covered pedagogical requirements for the game to be incorporated into a history class. The game’s main objective was to show three different facets of Mariano Melgar: as an intellectual, poet and patriot. The game was divided into three levels. Each level highlights one of the facets of the historical figure.
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**Figure 1.** Video game “Mariano: The Last Dream”

**Figure 2.** Cinematic of the video game “Mariano: The Last Dream”

*Documentary “Mariano Melgar: Passion, Homeland and Poetry”. Is the fourth episode of the documentary series “Bicentenary: The Road to Freedom” made in 2016 (Aguirre, 2016). This chapter focuses on the life of Mariano Melgar, poet and thinker, and the importance of this historical figure for Peru’s independence.*
Class observation guide. To ensure that the lessons in both schools were equivalent and no external variables influenced teachers’ performance, the researchers designed an observation guide for the various parts of the lesson and all the content the teacher needed to address.

Test of knowledge about Mariano Melgar. With the help of a teacher, the researchers designed a test to evaluate knowledge about Mariano Melgar in both conditions. This test consists of 12 multiple-choice questions on the three aspects highlighted in the lessons about the life of Melgar: Melgar as a curious thinker, Melgar as a romantic poet, and Melgar as a patriot and hero.

Academic motivation test to learn history. The questionnaire “Why do you study at university?” (Matos, 2010) is a reduced version of the Spanish adaptation of the Academic Motivation Scale (AMS, Vallerand et al., 1992). For this study, the researchers adapted the test developed by Matos (2010) to measure students’ motivation to learn history. It has 23 items grouped into three scales: autonomous motivation (identified and intrinsic regulation), controlled motivation (external and introjected regulation), and demotivation. The researchers used a Likert scale of 1 (completely disagree) to 7 (completely agree). The sample adequacy measure Kaiser-Meyer-Olkin (KMO) was .749, which is an acceptable value (Field, 2009), and Bartlett’s sphericity test was significant ($\chi^2 = 428.03$, $df = 153$, $p < .001$). The total variability explained by the two dimensions is 56.32 percent. The former, autonomous motivation, explains 40.75 percent of the total variance, while the second, controlled motivation, explains 15.56 percent. The factorial loads reach values between .67 and .89 in the first factor, and between .30 and .76 in the second factor, acceptable values according to Field (2009). The researchers also conducted a reliability analysis of the two types of motivation regarding history lessons. For autonomous motivation they found an alpha coefficient of .946, and an alpha coefficient of .698 for controlled motivation. Both reliability indices are good, suggesting the test adequately measures controlled and autonomous motivation (Aiken, 1996). Likewise, all corrected item-total correlations reach adequate values (Field, 2009).

Self-efficacy test in history. This test was adapted from a self-efficacy scale for mathematics established by Usher and Pajares (2009). The test consists of 24 items divided into four subscales: Successful personal experiences (mastery experience); Successful experiences of others (vicarious experience); Social persuasion (social persuasion), and Physiological state (physiological state). The sample adequacy measure KMO was .738, which is a good value (Field, 2009), and Bartlett’s sphericity test was significant ($\chi^2 = 371.072$, $df = 136$, $p < .001$). In addition, the factorial analysis indicated the existence of four
factors, expected according to the theory. The total variability explained by these factors is 73.32 percent. The first factor, Personal Successful Experiences, explains 40.20 percent of the total variance. The second, Successful Experiences of Others, explains 15.51 percent of the total variance, while the third, Social Persuasion, explains 10.82 percent. Finally, the fourth factor, Physiological State, explains 6.78 percent of the total variance. The factorial loads reach values between .62 and .87 on the first factor, .65 and .83 on the second, .74 and .79 on the third, and .64 and .85 on the fourth. All of these are adequate values, according to Field (2009).

2.3. Procedure

With the support of a teacher, the researchers designed two history lessons (class A and B) about the life of Mariano Melgar. These were similar in both form and content. Class A used the video game “Mariano: The Last Dream” as a pedagogical tool, and class B used the documentary “Mariano Melgar: passion, country and poetry” (Aguirre, 2016). Next, the researchers designed a class observation guide to ensure that both classes complied with the proposed instructional design. This enabled them to monitor similarity, with the only difference being the support material that the teacher used. The researchers also designed a knowledge test about the life of Mariano Melgar with an expert on the subject.

The researchers adapted the scales about “motivation to learn history” and “self-efficacy in history”, and performed validity and reliability analyses for both scales with a sample of secondary students from Lima. They modified certain items based on the results, and then contacted the authorities of two schools in Lima.

The authorities of both schools told their students about the study and gave them a form to be signed by their parents if the students wished to take part. This form stated that students’ participation in the research was voluntary and anonymous and that they could withdraw from the evaluation without it affecting them in any way. After receiving permission from their parents, the students were randomly assigned (through a draw) to one of the two study conditions, class A (video game) or class B (documentary). The students who agreed to participate were gathered on a specific day and time in each school.

The researchers visited both schools first, to apply the knowledge test about Melgar, the motivation to learn history scale, and the self-efficacy in history scale. After a few days, the history lessons (A and B) were carried out simultaneously, with the students assigned randomly to each group. The lesson was
scheduled to last two hours, and went ahead without a hitch in the second school. However, due to logistical problems in the first school, the lesson had to be cut to approximately one hour and twenty minutes.

To deliver the lessons, two final-year Education students were trained on the subject of Mariano Melgar and the structure of the lessons. The student in charge of class A was taught about the content and mechanics of the video game, while the student in charge of class B was taught the information to be provided to the students. At the end of both sessions, the researchers again applied the knowledge test, the motivation to learn history scale, and the self-efficacy in history scale.

2.4. Statistical Analysis

The Statistical Package for Social Sciences (SPSS, version 23) software was used to analyze the information. The researchers first performed the Shapiro-Wilk normality test to identify whether the results had a normal or non-normal distribution, and used this as a basis for pre test and post test comparisons and correlations.

3. Results

The researchers started by conducting the Shapiro-Wilk normality test to establish whether the sample had a normal distribution. Most of the variables did so. However, some variables did not, and so the researchers examined asymmetry and kurtosis coefficients. These statistics were not greater than 3 and 10, respectively, indicating that non-normality was not severe (Kline, 2013). The researchers therefore conducted a parametric analysis.

They performed a t-test for related samples, to examine if the intervention with the video game and the documentary had influenced students’ knowledge. In the “Documentary” group, the scores before the intervention ($M = 7.17$, $SD = 4.81$) were significantly lower than scores after the intervention ($M = 13.00$, $SD = 3.47$), $t(29) = -6.25$, $p < .05$, $d = 2.32$. Similarly, significant differences were found in the scores before ($M = 7.03$, $SD = 4.75$) and after ($M = 14.35$, $SD = 2.58$) in the “Video Game” condition, $t(36) = -9.50$, $p < .05$, $d = 3.17$. This indicates that after the lesson (regardless of the tool used), students’ performance had significantly improved.

No statistically significant differences were found in the knowledge test scores before the intervention in comparisons between groups (Video Game and Documentary). The “Video Game” condition ($M = 7.03$, $SD = 4.75$)
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and the “Documentary” condition ($M = 7.17$, $SD = 4.81$) were similar for this variable, $t(65) = -.119$, $p > .05$. This status changed after the intervention, since significant differences were found in the knowledge test scores. The students who played the video game ($M = 14.35$, $SD = 2.58$) obtained higher scores than those who watched the documentary ($M = 13$, $SD = 3.47$), $t(65) = 1.83$, $p < .05$, $d = .45$.

The researchers also conducted a t-test for paired samples to find out if the intervention led to a change in self-efficacy. In the “Video Game” condition, they found significant differences only in the Vicarious Experience dimension between the scores before ($M = 4.40$, $SD = 1.16$) and after the intervention ($M = 4.17$, $SD = 1.15$), $t(35) = 2.41$, $p < .05$, $d = .81$. Similarly, in the “Documentary” condition, they found significant differences in the Vicarious Experience scores before ($M = 4.31$, $SD = 1.07$) and after the intervention ($M = 3.73$, $SD = 1.07$), $t(26) = 4.19$, $p < .05$, $d = 1.56$.

Regarding motivation, there were no significant differences in the dimensions evaluated after the video game intervention; in other words, students did not report a change in their motivation after playing the video game. This varied however in the “Documentary” condition, because there were differences in “Autonomous Motivation” and “Demotivation” (Table 1). In the former, scores decreased after the history lesson (with the documentary). In the latter, the scores increased after it (increasing the demotivation on the history course).

Table 1. Comparison of Motivation Mean Scores in the “Documentary” Condition

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th>df</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>Autonomous</td>
<td>25</td>
<td>4.12</td>
<td>1.04</td>
<td>26</td>
<td>3.84</td>
</tr>
<tr>
<td>Demotivation</td>
<td>25</td>
<td>2.19</td>
<td>0.95</td>
<td>26</td>
<td>2.79</td>
</tr>
</tbody>
</table>

* The correlation is significant at the .05 level (unilateral).

When comparing self-efficacy and motivation between groups (video game and documentary), no statistically significant differences were found in the scores before the intervention, confirming that these variables were similar between the groups. After the intervention, scores differed in the Vicarious Experience dimension (Self-efficacy), in which the students in the “Video Game” condition ($M = 4.17$, $SD = 1.15$) had higher scores than those in the “Documentary” condition ($M = 3.69$, $SD = 1.06$), $t(62) = 1686$, $p < .05$, $d = .42$. Furthermore, in the Demotivation dimension (Motivation), the
students in the “Video Game” condition ($M = 2.04$, $SD = 1.04$) had lower scores than those in the “Documentary” condition ($M = 2.68$, $SD = 1.17$), $t(60) = -2.283$, $p < .05$, $d = .57$ (greater demotivation with the Documentary).

Finally, the researchers also assessed the relationships between motivation and self-efficacy (Table 2).

**Table 2. Correlations Between Self-efficacy and Motivation by Condition**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Controlled</th>
<th>Autonomous</th>
<th>Demotivation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Video Game</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mastery Experience</td>
<td>-.088</td>
<td><strong>.635</strong>*</td>
<td>-.342*</td>
</tr>
<tr>
<td>Vicarious Experience</td>
<td>.046</td>
<td><strong>.849</strong>*</td>
<td>-.341</td>
</tr>
<tr>
<td>Social Persuasions</td>
<td>.042</td>
<td><strong>.546</strong>*</td>
<td>.040</td>
</tr>
<tr>
<td>Physiological State</td>
<td>-.314</td>
<td><strong>.645</strong>*</td>
<td><strong>-.588</strong>*</td>
</tr>
<tr>
<td><strong>Documentary</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mastery Experience</td>
<td>.033</td>
<td>.528**</td>
<td>-.327</td>
</tr>
<tr>
<td>Vicarious Experience</td>
<td>.328</td>
<td><strong>.827</strong>*</td>
<td>.068</td>
</tr>
<tr>
<td>Social Persuasions</td>
<td>.139</td>
<td><strong>.740</strong>*</td>
<td>.039</td>
</tr>
<tr>
<td>Physiological State</td>
<td><strong>-.439</strong></td>
<td>-.047</td>
<td><strong>-.547</strong>*</td>
</tr>
</tbody>
</table>

**. The correlation is significant at the .01 level (bilateral).
*. The correlation is significant at the .05 level (bilateral).

It is autonomous motivation that has more significant correlations and a higher and more direct force ($r > .5$) in both conditions (Video Game and Documentary). This is not so however with the physiological state (self-efficacy) in the “Video Game” condition. In other words, in the group that played the video game, when any of the self-efficacy dimensions increase, autonomous motivation also increases. In addition, the demotivation factor correlates negatively with two dimensions of self-efficacy in the “Video game” condition. In other words, this means that when the experience of mastery and physiological state decreases, the demotivation will increase. Finally, in the group that watched the documentary, the dimensions of controlled motivation and demotivation correlate inversely with the physiological state.

4. Discussion

This study aimed to identify the influence of an educational video game based on a Peruvian historical character, on the knowledge, motivation, and self-efficacy of ninth grade students from different schools in Lima. For this purpose,
The video game “Mariano: The Last Dream” was incorporated as pedagogical material and compared with audiovisual material, more frequently used in history instruction.

In the first place, intra-group results show that, in both groups, students showed an improvement in their knowledge about the historical character. This finding was expected to some extent since none of the students had prior knowledge about the character. Thus, regardless of the support material, teaching them about this subject was expected to improve their knowledge.

Additionally, both groups had similar studied variables before starting the intervention, which enabled the researchers to define whether the subsequent differences should be considered. In this case, after the intervention, the groups had significantly different scores on the knowledge test, especially the group that played the video game. This means that the video game as a pedagogical tool used in the classroom has a more positive influence than other traditional tools, such as audio-visual media (documentary). These findings are consistent with previous studies, such as those by Evaristo et al. (2016), Guerrero et al. (2021), and Hoy (2018). It is important to mention that both history classes were similar, the only difference was the tool used: the video game or the documentary. This result may indicate that the characteristics of the tool are important for achieving educational objectives. The video game used in the study was designed with pedagogical requirements and learning objectives established. The students had to interact with different symbols that were shown in different aspects throughout the game (music, cinematics and graphics) and use the information to pass each level. There were also activities in the history class that were designed for the students to analyze the information in the video game and the documentary and draw their conclusions about Mariano Melgar. This reflects the importance of the role of the teacher for guiding learning.

There were no significant differences between the groups in their motivation to learn history. However, the students that watched the documentary saw their autonomy reduced and their demotivation increased. Hence, it should be emphasized that, although playing a video game did not cause a change in motivation, it did not reduce students’ autonomous motivation, unlike the documentary. This may indicate that the traditional means of teaching history limit students’ autonomy, which may produce a diminished interest in the subject. This concurs with the point made by Wei et al. (2019) regarding prolonged exposure to a controlling context, which gives priority to content presentation to the detriment of autonomy. This in turn can lead to students’ losing interest in the subjects taught at school and feeling discouraged.
Regarding self-efficacy, no significant differences were found before the intervention. After the intervention, there were only differences in one type of self-efficacy. Specifically, vicarious experience was lower in the group that watched the documentary compared to the group that played the video game. This may be because in the former, students do not interact directly with the content presented, and in the latter, students experience a higher degree of interaction with the content (Larsen & James, 2022). Moreover, the correlations suggest a significant relationship between autonomous motivation and the different types of self-efficacy evaluated in this study.

There is evidence of a positive trend between motivation and self-efficacy, also found in other studies, such as those of Kryshko et al. (2022), Tisza et al. (2021), and Lin and Wang (2021). This may be because video games have the potential to alter physiological states due to the experience of immersion. Hence in the case of the documentary, there would be no correlation since it is a passive medium that does not necessarily influence the student. Additionally, video games generate an immersion experience, which could help students reach a state of flow (Abuhamdeh, 2020).

Flow can be seen as an emotional state that encompasses the person as a whole due to the interaction with an immersive activity (Csikszentmihalyi, 2000; Leroy, 2021). This leads to a person's attention being directed toward the activity they are engaged in, bringing them high levels of enjoyment (Csikszentmihalyi, 2000; Nguyen et al., 2021; Özhan & Kocadere, 2020). Also, flow can be beneficial in the educational context because students have a positive experience with the class content, and, consequently, with their learning (Bressler et al., 2021; Nakamura & Csikszentmihalyi, 2014).

5. Conclusions

Both groups showed improvements in their knowledge about a historic figure (Mariano Melgar). However, the students in a class which used a video game as a pedagogical tool showed better performance and less demotivation than the students in a class in which they watched a documentary. For these findings to be replicated, video games must be incorporated into the class in an articulated manner, otherwise, there is a risk of wasting the benefits they can provide. Furthermore, the purpose of this study was not to identify students’ level of immersion while playing video games. However, in light of the results, future studies should address this variable, as it may provide more evidence of the functionality and usefulness of video games as educational materials.
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