

AI-generated avatars in MOOCs: A comparative analysis of financial viability and perceived satisfaction compared to traditional videos

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Abstract. MOOCs offer flexibility and accessibility in online education. The generation of educational videos, traditionally done by recording authors, demands a significant investment of time and resources. As an alternative, avatars generated by Artificial Intelligence (AIGen) has gained relevance, although comparative evidence remains limited. This study compared the financial viability and perceived satisfaction in two MOOCs: one with traditional videos and the other with IAGen avatars. The courses shared characteristics in duration, content and participant profile. The financial evaluation used an incremental cash flow considering Internal Rate of Return (IRR), Net Present Value (NPV) and Investment Recovery Period (IRP) over a five month horizon. Perceived satisfaction was measured using a Likert questionnaire and analyzed with Mann-Whitney U tests. The financial results showed economic viability of using IAGen (IRR 1169.03 %, NPV \$9,889.72 and IRP of 1 month). In terms of satisfaction, no significant differences were found between the two courses. This study indicates that avatars are an alternative to traditional recording without affecting the perception of the course, while reducing costs and accelerating the return on investment. However, their implementation must balance economic benefits with pedagogical requirements to enhance the online learning experience.

Keywords: MOOCs, avatar, video generation, financial

1 Introduction

In the last decade, MOOCs (Massive Open Online Courses) have democratized access to academic content, but still face challenges that limit their effectiveness. On the one hand, the completion rate is between 5% and 15% [1], [2], evidencing problems of student engagement. On the other hand, the production of high quality educational videos (which requires filming, editing and post-production) raises costs and hinders scalability [3]. This is where Generative AI (AIGen) emerges, which enables the creation of digital avatars that emulate the voice, gestures and presence of a human instructor, adapting to different pedagogical approaches [4], [5]. However, there is no consensus on the level of confidence and motivation that can generate in students [3], [4]. Although it has been pointed out that these IAGen avatars could optimize resources and improve accessibility, the consequences of the absence of human contact and the retention and credibility of the content are unknown [4], [5], [6], [7].

In this context, the present study aims to compare traditional educational videos versus those generated with AI in MOOCs, evaluating two main aspects: financial viability through indicators such as Internal Rate of Return (IRR), Net Present Value (NPV) and Investment Recovery Period (IRP). Additionally, it will evaluate the student experience, assessing qualitative variables such as perceived learning, duration of the videos and combination of materials. The objective is to determine whether the avatars can match or surpass the results of conventional videos.

2 Methodology

2.1 Course design

The design and implementation of the two MOOCs followed the guidelines of the MOOC-Maker model [8], [9]. They were developed in Spanish, with asynchronous access and free certification for those who achieved a minimum score of 70 points. The MOOC "Key Concepts for Transfer Funds"¹ was structured in four lessons, composed of readings, traditional videos, quizzes and interactive activities. It lasted 12 hours, with contents focused on innovation, technological maturity, knowledge transfer and intellectual property. It was aimed at academics, researchers, entrepreneurs and public sector officials in Ecuador interested in financing through CEDIA. The MOOC "Discover the Keys to Personal Data Protection"² had three lessons, integrating lectures, videos with AI avatars, quizzes and interactive activities. Designed for a duration of 8 hours, it addressed data protection legislation and its practical application in organizations. Its target audience included everyone who handles personal data in Ecuador.

Table 1. Video Distribution.

	Number of videos traditional method	Number of videos IAGen method
MOOC Key Concepts for Funds	23	-
MOOC Discover the Keys to Personal Data Protection	-	11

2.2 Context of traditional method and method with AIGen

In the context of this study, it focuses on the production and post-production phases, identifying the necessary processes and resources [3]. In the traditional method, production consists of recording the content with a presenter, use of recording equipment, as well as the participation of an audiovisual technician and a content presenter. Post-production involves editing the recorded material, adjusting audio and video, and generating the final product (Table 2).

¹ https://onemooc.cedia.edu.ec/courses/course-v1:onemooc+CONNECT-02+2023_T2/about

² https://onemooc.cedia.edu.ec/courses/course-v1:onemooc+PI-01+2024_06/about

Table 2. Creation of videos by the traditional method.

	Equipment	Technician	Presenter	Time (minutes)
Video Content Creation	x	x	x	120
Video editing and production	x	x	-	240
		Total minutes		360

In IAGen's avatar-based method, production is carried out in two steps. First, a base video is recorded using the same resources as in the traditional method: recording equipment, audiovisual technician and content presenter. Then, the video is generated using the IAGen platform, which also requires an audiovisual technician [10]. Post-production in this method includes editing the generated video, optimizing the audiovisual quality and the final adaptation of the content (Table 3).

Table 3. Creación de videos por el método basado en avatares de IAGen.

		Equipment	Technician	Presenter	Time (minutes)
Step 1	Mother Video Recording (footage)	x	x	x	30
	Consentment Video Recording	x	x	x	30
	Total minutes step 1				60
Step 2	Script Tuning	-	x	-	60
	Video Content Creation on IAGen Platform	-	x	-	120
	Editing and Montage	x	x	-	120
	Total minutes step 2				300

It is important to mention that both methods require production and post-production processes. The difference lies in the fact that IAGen introduces an additional stage in production, where the avatar is generated, which will serve as the basis for generating the desired videos without the need of a content presenter. Meanwhile, the traditional method relies on direct recording with a presenter. For this study, it has been defined that the number of videos within a MOOC is 16, and segmented by equipment and labor, it would be as follows:

Table 4. Segmentation of equipment and labor.

	Traditional Method (minutes)	IAGen Method (minutes)
Equipment	1920	60
Labor	3840	4800

Total minutes	5760	4860
Total hours	96	81

2.3 Perceptions assessment instrument

A questionnaire was designed of student perceptions, where the common questions in both MOOCs were the following: Did I learn a lot in this course (learning)?; Was the duration of the videos adequate (duration of videos)?; Did the learning materials use an adequate combination of text, videos and interactive features (combination of resources)? The available responses were five options on a Likert scale ranging from the options "Strongly agree" to "Strongly disagree".

2.4 Methods of analysis

Financial analysis. AIGen implementation involves the variation of operational processes. For a feasibility analysis, an incremental cash flow allows determining whether it is financially viable to use AIGen. It considers the variation in costs or revenues of the traditional way with respect to the use of AI, to determine the financial viability of the change through indicators such as the Present Value Net (NPV), the Internal Rate of Return (IRR) and the Investment Recovery Period (IRP). A time horizon of 5 months was considered, assuming that the audiovisual production of a MOOC can be done in 1 month. Necessary resources were identified, without assuming changes in revenues.

Perception analysis. To evaluate student satisfaction and perception, the results of the common questionnaires applied in both MOOCs were taken. Responses were compared using the Mann-Whitney U test, a nonparametric test that contrasts two independent samples without assuming normality in the distribution. This analysis focused on the three detailed common questions (learning, video duration and resource mix).

3 Results and discussions

3.1 Participants' perceptions

In the traditional MOOC, 207 responses were obtained, while in the AI MOOC, 137 were recorded. In both modalities, the majority of participants rated their experience very positively. For each of the three common questions, the highest rating options (4 and 5) were the most selected. In fact, the lowest responses (1 and 2) barely appeared, and the averages in all cases hovered around values close to 4.6 or higher, with medians of 5.0. The Mann-Whitney U statistical test did not determine significant differences ($p > 0.05$) in any of the three questions. These findings are consistent with the study by Leiker et al. [7], which found similar learning outcomes between AI-generated videos

and human-produced videos, suggesting that IAGen videos can be equally effective in microlearning contexts. Regarding the cognitive dimension of learning, it is equally satisfied in both formats.

On the pedagogical side, the absence of differences in perceived learning suggests that AI avatars can replace or complement traditional video production without undermining educational quality. Zheng and Huang [11] also found that avatars can enhance the learner experience by increasing participants' reflection and self-assessment. However, human interaction can play a key role in bond building: Vallis et al. [12] found that although students accept avatars, they may be perceived as less personal than human instructors.

3.2 Financial results

Based on the incremental cash flow, the following indicators were obtained: 1) IRR: 1169.03%; NPV: \$9,889.72; IRP: 1 month. These values exceed the reference rate (8.5% per annum, approximate value of a fixed-term deposit) and evidence the profitability of adopting AI for the creation of videos in MOOCs. The positive NPV implies a return by bringing money to present value, and the IRP of 1 month falls within the analysis horizon of 5 months. These results reinforce the economic viability of implementing IAGen avatars. Reports at the corporate level also describe efficiency and cost reduction benefits of using IAGen tools, as indicated by the research of Leong et al. [13], which highlights the scalability and efficiency of AI-generated content in digital educational environments.

4 Conclusions

The implementation of videos generated with IAGen represents an alternative for continuing and distance education, especially in institutions with budgetary constraints. Although the initial investment may be a challenge, the benefits in terms of cost reduction and resource optimization are relevant. However, to ensure the effectiveness of these tools, long-term research is needed that analyzes not only initial student perceptions, but also knowledge retention, emotional experience and academic motivation. It is recommended that future research include objective tests of learning and measures of cognitive load to provide a comprehensive assessment of the educational potential of AI-generated videos.

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