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A comparison between artificial intelligence and traditional methods for creating podcasts as learning tools in health sciences

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Abstract

The impact of Artificial Intelligence (AI) over the last decades is reflected in the diffusion of tools for automated learning and the availability of applications. Therefore, there is a need to study the risks and benefits of developing hard skills and critical thinking in health education, where tools such as podcasts have been employed to enhance learning. To determine whether the use of AI improves learning when developing a podcast about a health sciences-related topic, we conducted a cross-sectional analytical study with convenience sampling and a descriptive observational approach. We evaluated 52 health science students from a private university in Mexico using 10 questions related to the podcast topic. The assessment of learning, comparing students who used AI with a control group that performed traditional research, showed no significant differences in their mean grades ($p = 0.81$). The use of AI did not significantly compromise students' learning. These results were further supported by students' perceptions of their own learning, with most expressing positive opinions. AI may be implemented in health sciences education with positive reception by students.

Keywords: Artificial Intelligence (IA), Health science education, Learning tools, Podcast.

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1. Introduction

Artificial Intelligence (AI) has been a trending topic for the last decades, gaining increased attention after the COVID-19 pandemic due to challenges in the educational sector and the search for new methods to disseminate knowledge, especially in health, technology, research, and industry. With the growing adoption of machine learning-based text

development tools and their availability to the public, AI has gained greater importance, diffusion, and relevance in studying its advantages and risks across various fields. The present study focuses on its use in developing podcasts as traditional research tools. Specifically, it examines its application as a machine learning-based text generator, enabling students to create structured content for podcast dialogues [1, 2].

AI has been gradually becoming a daily tool, and education is no exception. Currently, machine learning robots such as ChatGPT and others can do homework, write books, chapters, essays, blogs, among other things. This makes it necessary to ask and study the suitability, regulations, ethical issues, advantages, and risks, as well as what type of alternative evaluation could be introduced to confront these challenges in the educational field and beyond [3].

Chat Generative Pretrained Transformer, "Chat-GPT," had its beginning on November 30th, 2022. It is a chatbot that, through AI, can predict information based on algorithms and data obtained from various digital platforms and files. It is capable of generating seemingly informative texts, even citing its references [4].

These platforms have brought about significant changes in the educational environment, as they respond to simple questions as well as those requiring more in-depth responses. Not all the information used is verified; therefore, we must apply our own criteria to determine which parts of this information are usable and what limitations may be present [4].

The functioning of Chat-GPT is complex because it uses language understanding as well as translation to facilitate the presentation of information and the resolution of different tasks. In this understanding mechanism, a non-supervised pre-workout is required, in which different texts from various platforms are provided without a specific task. After analyzing the information presented, this chatbot can reply in human language, including different ways to write texts and how to answer questions. After the pre-workout phase, a task is given, which is resolved using the tools and texts provided before, either by using the previous text or rewriting one in its own way of language understanding. This is why the information it provides is not always accurate [5].

By using this tool for different tasks, a series of recommendations should be followed to achieve better final performance. It can be considered a useful tool; in this context, plagiarism is a concern, which can be frequent because summaries of scientific content are produced with wording very similar to that of humans [5].

On the other hand, podcasts refer to an audio file, which can be downloadable or not from the web, and can be listened to in every moment [6]. Its characteristics allow users to share and divulge information exclusively in audio format through the Internet, and this has been consolidating in education as a pedagogical option for improving learning experiences, provided it meets certain structural characteristics such as narrative content, which can be formal or informal, and vary in length to accommodate different learning strategies that every health science student should have used, such as problem-based learning, clinical cases, investigations, projects, service learning, and clinical simulation [7]. Besides, optimizes the studying time and a responsibility perception is obtained by its own learning [8].

Among the multiple available tools that have been developed from Web 2.0, such as podcasts, teaching, and learning strategies have evolved and allowed the scope of education to break barriers, supporting teachers and students to be miles apart and achieve a very different interaction than the traditional one, empowering the transmission and acquisition of knowledge [9].

Podcasts as an educational tool have been implemented for several years; they have been integrated into diverse educational contexts over the course of a decade. They stand out for being an accessible and flexible medium that facilitates self-directed learning processes and access to educational content at any time and place [10].

The creation process of podcasts has three phases: 1) The creation of the podcast itself, where we determine the topic and create a script to facilitate participant interaction and ensure coherence. 2) The generation of debate among podcast participants to clarify doubts or complement information by providing feedback. 3) The dissemination of information, where different podcasts are shared with a selected audience [2].

AI through such applications can offer better teaching and learning opportunities through personalization and adaptability of educational systems, despite the ethical and privacy challenges associated with AI implementation in classrooms[3]; similarly, Holmes, in his book, explores how AI can transform education, addressing opportunities such as learning personalization and improvements in educational efficiency. In a detailed analysis of AI's potential to revolutionize education, Holmes et al. examine various AI applications, from learning personalization to the automation of administrative tasks [11].

For its part, Zawacki, in a systematic literature review about AI applications in higher education, reports that among its principal findings is the lack of active participation from teachers in the investigation and development of AI applications [12].

The development of AI has opened new pathways in the educational and teaching fields to assist students in acquiring new skills [Chatila], but it raises questions about whether it causes them to lose other skills or diminishes their critical or design capacities. This study aims to determine whether AI, compared to traditional investigation methods, offers an improvement or acts as a learning barrier for health-related topics among students pursuing nursing or physical therapy degrees.

This study's objective is to determine which method provides better learning and knowledge acquisition in a health science-related topic in the podcast elaboration.

2. Materials and Methods

Under an observational descriptive focus, a transversal analytic study by convenience was made.

A purposive sampling of young adults between 18 and 25 years who met the inclusion criteria was conducted. As the sampling unit, we selected 52 students enrolled in the third semester of the nursing and physical therapy degree programs at a private university in Mexico.

Participants in the study were asked to conduct an academic investigation related to the topics of the subject taught. For students from the nursing degree, the topic was related to substance abuse in the Pharmacology and Toxicology subject; meanwhile, the topic for students in the physical therapy degree was related to central nervous system pathologies in the Neuropediatric subject. The investigation for both subjects aimed to create a presentation based on the topic for each group, with an impact on the subject grade to confirm the purpose through its development. Half of the students in both groups were instructed to use AI exclusively for creating their presentations, particularly with the Chat-GPT 3.5 platform, with the freedom to choose other AI tools as support. The control group, comprising the other half, was asked to use traditional information sources such as books, articles, and web pages, but to exclude the use of AI tools.

2.1. Knowledge Evaluation

Participants were subjected to a 10-question evaluation related to the investigation topic, conducted by the subject teacher according to the general rubric of the activity. For this activity, open questions were avoided to prevent ambiguity during the evaluation.

2.2. Perception of the use of Artificial Intelligence Survey

Participants in the study answered a final survey on the Google Forms platform with directed questions to collect students' general impressions of AI use, as well as its strengths and weaknesses. The questions allowed students to select all applicable answer options. The questions and available answers are shown in Table 1.

Table 1.
Perception of the use of Artificial Intelligence Survey.

Question	**Available Options**
Age	(Open question)
Genre	
	• Male
	• Female
Degree	
	• Physical therapy
	• Nursing
Did you enjoyed using AI as a learning tool?	
	• Yes
	• No
Why?	
	1. I have used AI before
	2. I like using this tool
	3. Speeds up my work
	4. Performs a structured script
	5. It is the first time I use it, and it seems complicated
	6. I prefer to realize investigation by my own in different sources
What strengths did you find by using AI?	
	1. Speeds up investigation
	2. Ease
	3. Reduces mental overwhelming
	4. Professionalism
	5. Allows generating conversation
	6. Consults multiple sources
	7. Speeds up the script redaction
	8. Translates into my language
	9. Decreases eye strain
	10. Generates High quality information
	11. Ease multidisciplinary projects
	12. Helps inspiration with trending ideas
	13. Improve question formulation skills
What disadvantages you found by using AI?	
	1. Unknown quality of the original data

	2.	Dependence of a technologic tool
	3.	It requires internet connection
	4.	It makes books obsolete
	5.	It limits learning
	6.	Reduced interest for referencing
	7.	It delimits critical thinking
	8.	I do not know how to use it
	9.	Its use does not seem ethic
	10.	Intimidating platform
	11.	It cannot answer precisely
	12.	It can limit creativity
	13.	It is necessary to corroborate information

2.3. Data Analysis

The survey results were exported from the Google Forms platform in a comma-separated value (.csv) format and analyzed using Microsoft® Excel® for Microsoft 365. The answer options selected were converted to discrete numeric variables for analysis as frequencies. The options were evaluated based on the frequency of their selection relative to the total population. Frequencies were compared using a chi-squared analysis according to the comparison groups, which were stabilized based on categories such as gender, degree, and their interest in AI. Categories showing significant differences were analyzed in contingency 2x2 tables, with the Odds Ratio (OR) and Confidence Interval (CI) calculated. The comparison of means in the evaluation of learning obtained after the activity was performed using the two-tailed Student's T test for samples of unequal variance. Statistical significance was defined as $p<0.05$.

3. Results

A total of 52 students were included in this study. The population comprised 21 nursing degree students (40.4%) and 31 physical therapy degree students (59.6%), both in their third semester. Students created a podcast using AI for the script, centered on an assigned topic from the program in health science-related subjects. The population also included 32 women (61.5%) and 20 men (38.5%).

Results in this study demonstrated that students who created the AI script for their podcast highlighted that the investigation process is eased (66%) and this helps them to redact their scripts (52%). The most highlighted strengths are that it eases investigation (86%), is easy to use (69%), reduces mental overwhelm (45%), and eases the redaction process (41%). Additionally, it improves their question formulation skills through AI (34%), by generating conversations and collecting information from various sources provided by the AI itself (Figure 1). This suggests they are open to experimenting and utilizing tools that reduce the time invested in the assigned activities. It highlights that they value time over other activity qualities, such as the learning obtained, the quality of the information used, and accessibility to other languages.

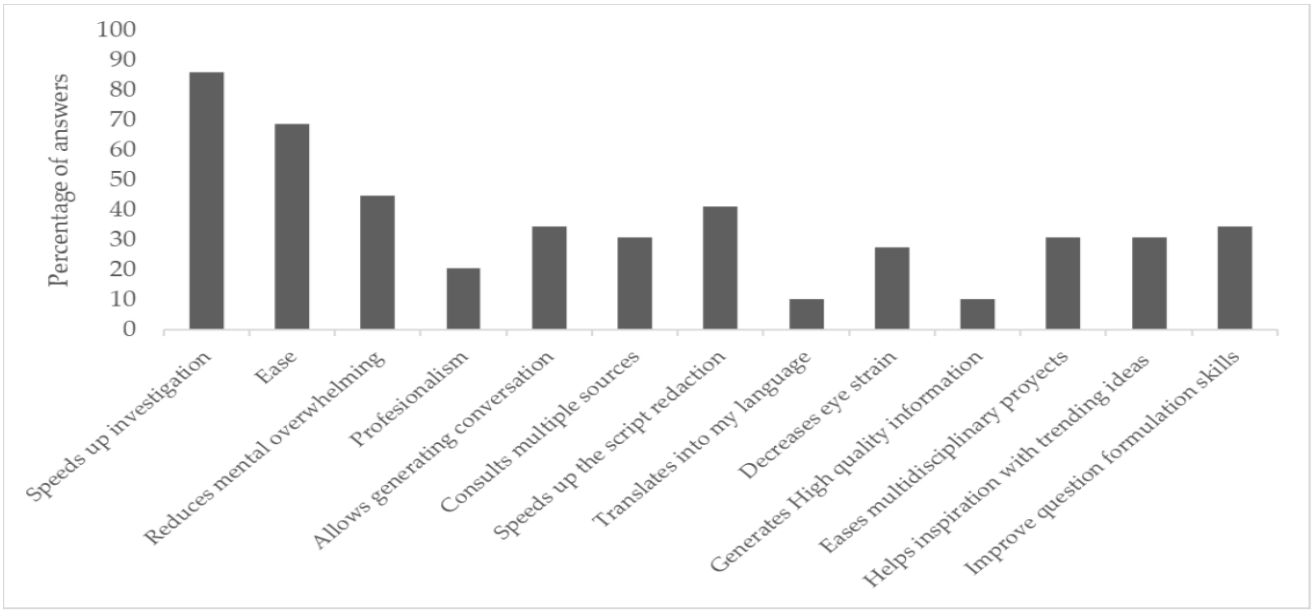

Figure 1.
Perception of the strengths in AI use. It shows the percentage of students who answer positively to each of the questions realized. In the horizontal edge the number of questions is shown. The question text can be found directly in Table 1.

Disadvantages that were expressed were that they do not know the quality of the information sources that the AI uses (62%), that it requires a stable connection to internet and devices (38%) and that it can limit creativity (34%) (Figure 2).

With these results, we can confirm that the participants in this study understand that the information provided by Chat-GPT 3.5 can be exposed to multiple errors due to its general access to texts in blogs and does not present validated scientific information. Therefore, we can anticipate that the participants are unlikely to be deceived by incorrect AI-generated information, and they would be inclined to verify the texts generated by the tool on their own. On the other hand, students at this university have access to the internet via Wi-Fi throughout the campus; however, they identified the need for a stable internet connection for the use of AI as one of the main disadvantages, which suggests that many students may have limited access to the internet required to fully utilize the potential of the Chat-GPT 3.5 platform.

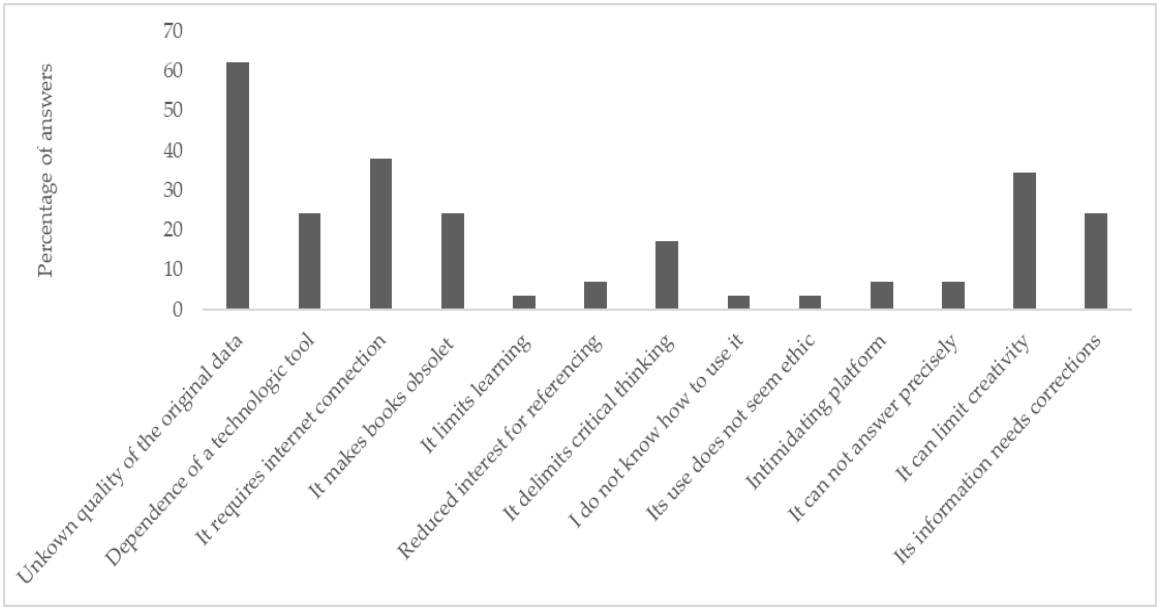

Figure 2.
Perception of the weaknesses in AI use. It shows the percentage of students who answer positively to each of the questions realized. In the horizontal edge the number of questions is shown. The question text can be found directly in Table 1.

The survey responses were analyzed according to population characteristics such as genre, degree, and taste for AI use. As expected, genre and degree did not influence perceptions of AI-generated learning, nor were they useful for identifying its strengths or weaknesses.

Similarly, liking AI was the only characteristic that had a statistical impact on the responses.

The analysis indicates that the group who did not like using AI is more inclined to feel that it limits their learning (OR = 110, with a CI between 1.4-8947.1) and that they do not find its use ethical (OR = 110, with a CI between 1.4-8947.1). However, a significant limitation of this analysis is the low number of students who disliked AI, as only one participant expressed this view. Additionally, the data did not allow us to definitively identify the primary reasons for their disapproval of this technological tool.

Lastly, we also conducted an evaluation of the learning outcomes among students who used AI versus a control group that conducted traditional investigations using books, articles, and web pages. We found that there was no significant difference between the average grades obtained by both groups, AI and traditional methods ($p = 0.81$). These results suggest that the use of AI did not significantly compromise the learning of students participating in our study.

The evaluation results also were corroborated by the students' perceptions of their own learning, since the majority expressed positive perceptions about AI use.

Hence, according to our data, while AI does not increase student learning, it does not seem to decrease it either, but it can make activities faster and more enjoyable for students. It is important to highlight that the students used AI as an assistant in the development of their activity, after which they carried out a process of integration and presentation of the investigated information. An important limitation in this study is that we did not evaluate the effect of AI on learning in activities exclusive to the request for deliverables.

4. Discussion

The semiquantitative analysis of this study revealed that the use of AI to elaborate a podcast script did not significantly compromise health science students' learning, since this was achieved in a similar way to their colleagues who made the script through traditional methods. Similar findings were reported by Fredy and Calderón, who highlighted the advantages and disadvantages of AI use in the educational field for learning scientific information with quality [13]. Chen observed the potential of AI in society and how this eases the development, efficacy and efficiency in the academic world [3].

In this order of ideas, among the points considered by students, as highlighted by AI, we find the ease and speed of data collection and script redaction, which aligns with the findings reported by Lucana and Roldan in their investigation. They mention that AI assisted students in the learning process and that students were not afraid to fail, considering AI as a friendly environment with great potential [14].

On the contrary, students were concerned about the quality of information sources, and this could limit their own creativity. This finding is similar to the one in Matsuo, et al. [15] which indicates that AI codifiers need to learn more efficiently, with clear learning rules and policies, to achieve a wider variety of tasks, survive, and avoid mistakes in their results, thereby having a significant impact on society [15].

In the study conducted by Mohammad, B. et al. in 2023, a meta-analysis was performed on different studies comparing the advantages and disadvantages of using AI in medical education, with a particular focus on Chat-GPT. Regarding the advantages, similar to our study, most participants in the various studies concluded that using Chat-GPT facilitates the summarization of information and the creation of text in a quicker and easier manner. Concerning the disadvantages, it was found that 40% of the studies identified the primary drawback of Chat-GPT as the reliance on information from unreliable bibliographies or false data, raising ethical concerns about the use of this tool. This issue was reported in 20% of the total studies [16].

Another of the most important limitations of Chat-GPT is the use of information from 2021 onwards; this is due to its launch in 2022. The information that was already available on web platforms could be analyzed with more precision. Meanwhile, studies and sources after that have been difficult to adapt to this tool, as well as the classification of what data is verified and what is not, as demonstrated in Jeyaraman, et al. [17] article posted in 2023 [17].

In this study, we compare the perceptions and learning outcomes obtained when students engage in an activity exclusively relying on AI-based tools against a control group that conducted a traditional investigation. We found that the primary strengths identified by students were related to ease of work and fatigue reduction, which represent significant advantages for undertaking additional activities and developing multiple skills.

The main disadvantages include uncertainty about the quality of information, reflecting students' awareness that they should not blindly trust the information provided by AI. Consequently, we did not find that the use of AI significantly diminishes the learning outcomes of students during this activity, positioning this tool as an important support in developing innovative strategies that promote education among new student generations.

5. Conclusions

Artificial Intelligence experienced significant development during 2022, prompting educational institutions to adopt new strategies in academic circles. Additionally, students' perceptions regarding the implementation and use of Artificial Intelligence for their academic development remain uncertain, particularly concerning learning development and the ethical aspects of its use. Based on previous results, the main strengths identified by students include the ease of work and the reduction of fatigue, which are important advantages for developing various skills.

The primary disadvantages include concerns about the quality of information, indicating that students remain cautious and do not blindly trust the information provided by AI tools. Furthermore, the use of AI does not appear to significantly diminish students' learning during activities, positioning this tool as a valuable aid in developing innovative strategies that promote education for new generations of students.

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