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Research paper

The Impact of Using ChatGPT and DALL-E2 on Developing EFL Teaching Content and Materials

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Abstract

The integration of artificial intelligence (AI) models, such as ChatGPT and DALL-E2, into education has garnered increasing attention during recent years. These AI tools have shown promise in enhancing teaching materials, but concerns about their potential negative impacts persist. This research study investigated the impact of ChatGPT and DALL-E2 on developing EFL Teaching Content and Materials. The researchers employed a mixed-method approach, including surveys, interviews, and content analysis, to investigate the diverse dimensions of AI integration in developing English teaching materials. Twenty-four EFL teachers, students, and instructional designers made up the target population of the current research. The results of the paired samples t-test revealed a statistically significant difference in assessment scores for a group of educators or instructional designers. The results of chi square showed that there is no association between the use of AI tools and the reported negative impacts. Additionally, AI-generated content was seen as valuable supplementary learning resources. However, the study also uncovers legitimate concerns related to depersonalization of learning, potential erosion of critical thinking skills, quality control challenges, bias in content generation, ethical considerations, technical challenges, and fears of losing educator expertise. These findings underscore the need for a balanced and thoughtful approach to AI integration in education.

Keywords: AI in material development, ChatGPT, DALL-E2, EFL teaching content, generative AI.

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Introduction

Artificial Intelligence (AI) has become an integral part of the modern educational landscape. Among the AI tools that have emerged, ChatGPT and DALL-E2 stand out as remarkable language models, developed by OpenAI, with the ability to generate high-quality text and images, respectively. Their applications in education are multifaceted, holding the promise of evolutionizing the development of teaching content and materials. However, as with any technological advancement, the integration of AI into education also raises questions about potential drawbacks and challenges.

One kind of artificial intelligence is generative AI, which enables users to create original content faster than they could manually, including different text types and imagery. Theoretically, educational institutions might employ this generative AI to quickly produce coursework for their students, saving them time and money while raising their job caliber.

GenAI models use a cutting-edge method to identify patterns and produce unique text, images, audio, videos, and code. Examples are ChatGPT, Bard, Stable Diffusion, and Dall-E from the GenAI toolkit. The adoption of GenAI across a range of sectors, such as healthcare, pharmaceuticals, education, media, and tourism, has increased attentions toward research studies which investigate its capacity to handle complicated situations.

For instance, ChatGPT has increased interest in using Since its debut in higher education in November 2022 (Hu, 2023). OpenAI developed conversational AI technology using a massive autoregressive language model with over 175 billion parameters. To various text-based inputs, it can provide responses that resemble a human's. The model can comprehend user input, provide responses, and sustain coherent conversations on various topics since it has been trained on various texts, including books, papers, and websites. There has been much discussion about how it might

change disciplinary practices like healthcare communications (Eggmann et al., 2023), medical writing (Biswas & Kitamura, 2023), surgical practice (Bhattacharya et al., 2023), and teaching and learning in higher education (e.g., Adiguzel et al., 2023; Baidoo-Anu & Ansah, 2023 Hamzehloo&Hamzehloo,2023; Neysani et al., 2024) are all areas that might use improvement.

One of the main usages of GenAI is that it is utilized in higher education to enhance students' learning experiences. GenAI can also respond to human instructions and produce a highly creative output. Text-to-text AI generators can assist students by letting them use applications like ChatGPT to collaborate on ideas and gain comments on their work (Atlas, 2023). Technologies for text-to-image AI, such as DALL-E2 and Stable Diffusion, can also be helpful educational resources for imparting technical and creative principles in art and design (Dehouche & Dehouche, 2023).

Creating instructional materials is a task that mostly takes lots of time for teachers. It may be very time taking to find a text on a particular subject. Even after identifying or creating a text, you might need to change it to suit your pupils' reading levels. Then you might scan the writing to identify helpful vocabulary. You may even look for pictures to accompany the text. Planning lessons would be better use of that time, such as self-reflection or binge-watching HBO.

There were not many choices up until lately. You had to write, locate, or buy something else if you did not want to use your coursebook. However, that has altered. OpenAI, also called ChatGPT, can create your teaching materials for you.

The main goal of the research center OpenAI is to create artificial intelligence that is trustworthy and ethical. Elon Musk was one of a group of scientists and financiers who launched the organization in 2015. They wanted to progress AI research and make sure it was put to good use for all of humanity. ChatGPT, A text-based conversational AI that produces responses, is a

part of OpenAI. that resemble a human's. It produces responses that resemble those that a human may produce using machine learning techniques. In fact, it can be challenging to locate photos or graphics for class assignments. It can take hours to snap your images or discover them online.

In conclusion, this research study explores the impact of using ChatGPT and DALL-E2 as learning tools to develop EFL teaching content and materials. The researchers seek to uncover how these AI models can effectively enhance the educational experience and, at the same time, identify the potential negative consequences of their integration into educational materials. Our research questions drive this exploration:

1-In what ways can ChatGPT and DALL-E2 be effectively used as learning tools to enhance teaching content and materials?

2-In what ways may ChatGPT and DALL-E2 negatively impact education when integrated into teaching content and materials?

Literature Review

In recent years, (AI) has played an increasingly prominent role in reshaping the landscape of education. Among the remarkable advancements in AI technology, ChatGPT, a language model developed by OpenAI, and DALL-E2, an image generation model, have emerged as noteworthy tools with the potential to evolutionize the creation of teaching content and materials.

Generative AI Definition

The definition of generative AI is "an AI system that synthesizes new, credible media from preexisting media" (Morris et al., 2023). One of the most important developments in machine

learning in recent years, according to several research publications (Morris et al., 2023; Muller et al., 2022; Mariani et al., 2021; Cao et al., 2023), is the expanding field of generative AI.

"Generative AI systems can develop fresh and creative content, including images, writings, music, video, and other types of design, in contrast to AI systems that offer choices or descriptions." AI can create unique text, imagery, and other types of media with a level of quality that is indistinguishable from content produced by humans (Morris et al., 2023, p. 1).

In a different study, Marcus et al. (2022) concluded that artificial intelligence has progressed to the point where it can improve the accessibility and efficiency of the entire information production process. Although there are many distinct types of generative AI software, according to some authors, tools like ChatGPT, Dall-E2, and Codex have gained widespread societal acceptance as easily accessible generative AI tools (Amirjalili et al.,2024; Marcus et al., 2022; Zhou & Nabus, 2023).

ChatGPT

According to its definition, ChatGPT is an OpenAI language model for creating conversational AI systems that can effectively comprehend and respond in a meaningful way to human language inputs. The ChatGPT software was developed as a multipurpose language model to generate text, according to ChatGPT's owner OpenAI, who claims this on its website (OpenAI, 2023). ChatGPT responses may sound human-like because they were developed using a massive amount of internet data authored by humans, including conversations (OpenAI, 2023). The viewer is greeted by a regular chat feature when they use ChatGPT's free feature and the following illustrations of using the program's features and restrictions.

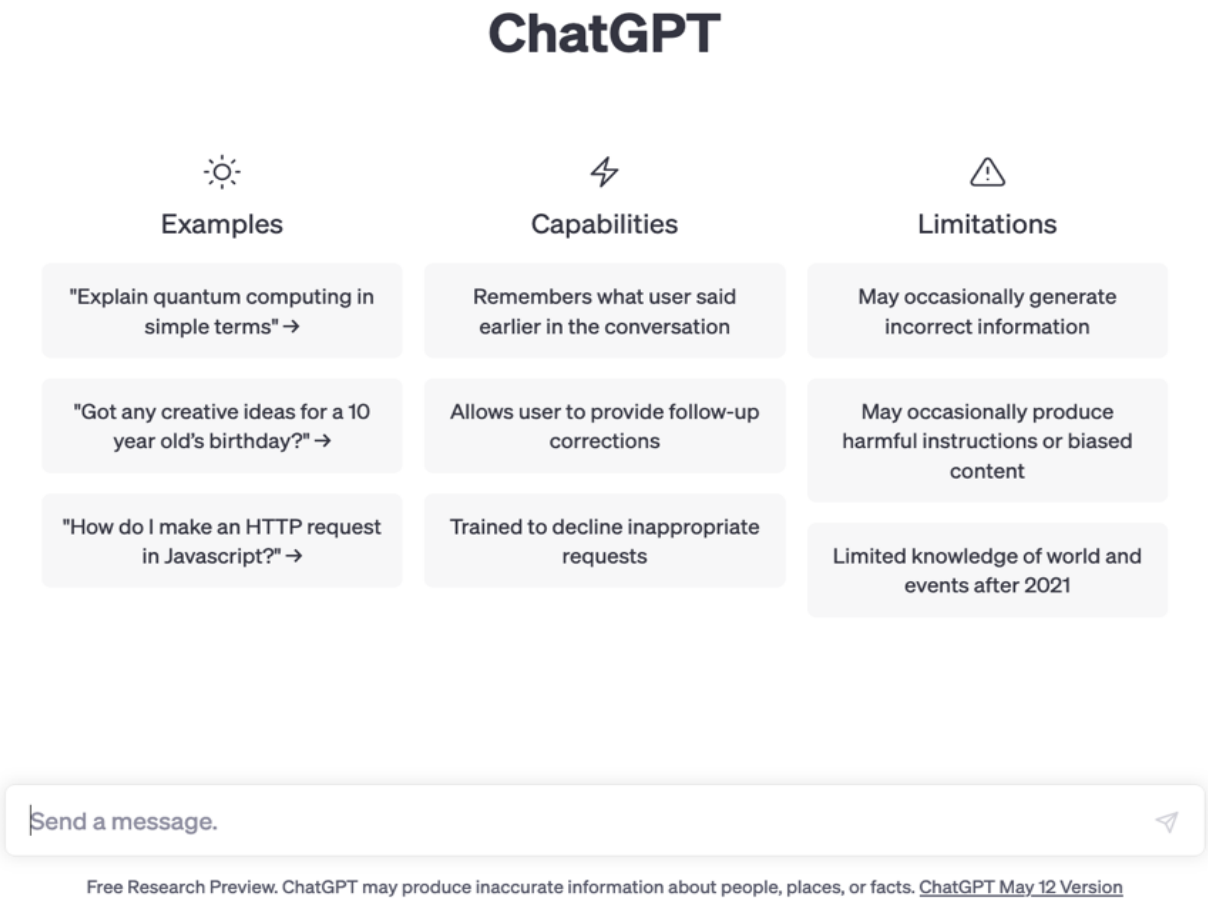

Figure 1

Presenting an overview of the ChatGPT user interface as well as the "limitations," "capabilities," and examples" that Open AI, the developer of the program, uses to define it

According to the authors of the work having a conversation about ChatGPT: How Might AI and GPT impact education and Libraries (2023) (Lund & Wang, 2023, p. 3), ChatGPT is a sophisticated chatbot that can perform more complex tasks for the user in addition to answering basic questions. Similar assertions were made in subsequent study publications once it was shown that ChatGPT could be applied in several situations, including helping to answer queries about public health (Biswas, 2023).

DALL-E2

Another cutting-edge generative AI model created by OpenAI, DALL-E2, can produce distinctive, high-quality images from textual descriptions in minutes. According to the OpenAI website, DALL-E2 is an artificial intelligence (AI) system that produces lifelike images, illustrations, and artwork in response to user-inputted commands. A conversation bar and some artificially intelligent graphics greet users when they land on the DALL-E2 webpage (OpenAI, 2023; DALL-E-2). The DALL-E2 system can create new synthetic imagery using the user's descriptive text inputs or change already-existing imagery that the user has been uploaded (Marcus et al., 2022, p. 1).

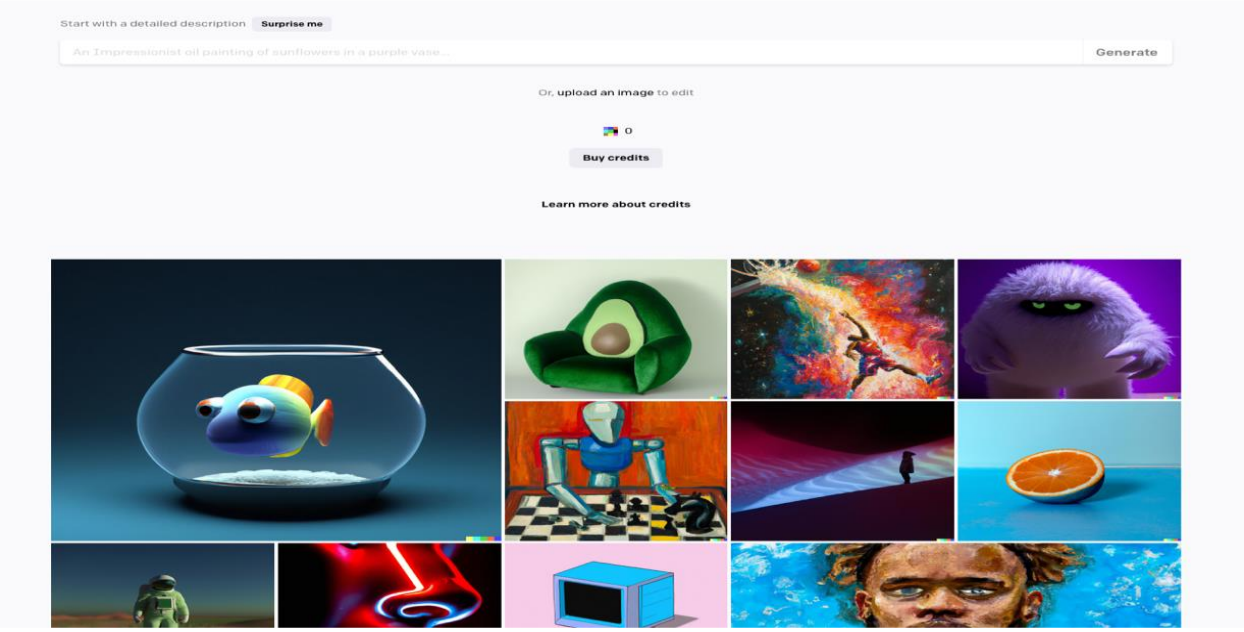

Figure 2

The chat feature of the DALL-E2 shows a summary of the user interface and some samples of artificially created graphics. The following overview includes the software's free edition because no credits were purchased

In one study Marcus et al. (2022) tested the DALL-E2 system's capabilities by issuing 14 extremely complex requests in the publication A very preliminary examination of DALL-E2 (Marcus et al., 2022). The DALL-E-2 program helps produce prospective visuals from which a graphical artist can select, claiming the authors' analyses of the system outputs.

Before using images created by artificial intelligence in safety-critical applications, the authors concluded that a far higher threshold must be used. The software's depictions of persons and human faces sometimes lacked quality (Marcus et al., 2022).

A similar point of view on DALL-E2 is presented in the ethical implications of DALLE-E2 opportunities and challenges. In one research study Zhou and Nabus, (2023), explained how the program offers intriguing opportunities for creativity and innovation but also drew attention to its ethical ramifications, including bias, discrimination, and other unexpected effects.

The Role of ChatGPT in Educational Content Development

Personalized and Contextualized Content Creation

The use of ChatGPT in applied linguistics has enabled the generation of personalized and contextually relevant teaching materials. Rai and Sarkar (2021) suggest that ChatGPT's ability to generate high-quality text based on a given prompt can be leveraged to create customized learning resources that cater to individual student needs. This personalization enhances learner engagement and understanding.

Immediate Feedback and Assessment

Several studies (Li et al., 2021; Thorne et al., 2019) have explored the potential of chatbots and conversational agents in providing immediate feedback to learners. By utilizing ChatGPT's

capabilities in real-time assessment and feedback provision, educators can develop teaching materials that do not only deliver content but also facilitate continuous assessment and improvement in students' language skills.

The Role of DALL-E2 in Creating Visual Content

Visual Aids and Creativity

DALL-E2, as an image generation model, extends its impact to the development of visually appealing teaching materials. The integration of DALL-E2 allows educators to create custom images, diagrams, and visual aids that enhance the comprehensibility of educational content. This aligns with the findings of Li et al. (2021), who emphasized the significance of visual aids and DALL-E2 in language learning.

Enhanced Engagement and Understanding

Visual content generated by DALL-E2 has the potential to improve students' engagement with educational materials. It aids in clarifying complex concepts, making abstract ideas more tangible, and accommodating various learning styles. This visual element aligns with the research by Thorne et al. (2019), which emphasized the importance of improving learners' pronunciation through interactive and visually engaging tools.

Challenges and Considerations

Although, there are some evidences which show the AI and DALL-E2 can be a helpful instrument in English language teaching and learning, but there are some challenges and

considerations in using technologies like AI and DALL-E2. Below some of these challenges are mentioned.

Interpretability and Bias

The integration of AI tools, including ChatGPT and DALL-E2, in content development raises concerns related to interpretability and potential bias (Dhawan, 2021). It is imperative for educators and content creators to be aware of these challenges and take measures to ensure that the materials generated are accurate, unbiased, and aligned with educational objectives.

The integration of ChatGPT and DALL-E2 in educational content development presents promising opportunities to revolutionize teaching materials and pedagogical practices. These AI models offer personalization, immediate feedback, creative visual content, and engagement-enhancing elements. However, educators and researchers must remain vigilant about challenges such as interpretability and bias. Future research and practical implementations should focus on harnessing the strengths of these AI tools while mitigating their limitations to unlock the full potential of AI in education content development.

Bridging this gap through empirical research can provide valuable insights into the tangible benefits and challenges of incorporating ChatGPT and DALL-E2 into education, especially in English language development. Such a research study can guide educators, policymakers, and instructional designers in making informed decisions about the adoption and optimization of these AI-driven tools for teaching content and material development. It can also shed light on potential adjustments and improvements needed to maximize their educational impact.

Method

Research Design

In this study researchers adopted a mixed-method approach, combining quantitative and qualitative data collection and analysis methods to provide a comprehensive understanding of the research questions. By combining quantitative survey data with qualitative insights from interviews and content analysis, the study aimed to offer a nuanced perspective on this critical aspect of English language development, with the ultimate goal of improving the quality of English language teaching materials by the means of AI and DALL-E2.

Participants

The participants of the current research study are English language teachers, students, and instructional designers from diverse educational settings, such as high schools, private language institutions, and online learning platforms in Iran, Isfahan. A diverse participant pool helped to capture a broad range of perspectives and experiences. A random sample of educational materials was chosen from different subjects and levels of education, including Vision and prospect and Top Noch series book. A total number of 24 Iranian English language teachers, students, and instructional designers participated in the survey. Convenience sampling was used to select them non-randomly based on their willingness to participate in the study. Convenience sampling is a type of non-random sampling technique that is described as "the selection of individuals who happen to be available for the study" by Mackey and Gass (2005) (p. 122). Purposive sampling, which is the most common kind of sampling used in EFL research, yielded eight participants for a follow-up interview (Dornyei, 2007). Mackey and Gass (2005) define a purposive sample as a non-random sampling technique in which the researcher selects certain participants based on

predetermined criteria or prior knowledge of the sample in order to collect data that piques their interest.

Table1

Participants' demographic data

Groups	N	Age	Gender	Major	Percent (%)
Teachers	10	25-50	Male	English Language Teaching	41.6%
Material designer	8	30-55	Male	Material Designing	33.4%
Students	6	18-22	Male	Humanities	25%

Data Collection Procedure

In The data collection process was designed with rigor and transparency in mind. Drawing inspiration from established qualitative research practices (Vasileiou et al., 2018). In- depth interviews, inspired by Bengtsson (2016), were conducted to gather detailed narratives from the participants. These narratives were analyzed using thematic analysis, a method advocated by Braun and Clarke (2006), to identify recurring themes and patterns.

Surveys Questionnaire

English teachers and instructional designers were asked to complete survey to gather quantitative data on their experiences and perceptions of using ChatGPT and DALL-E2 in content development. Students completed survey to assess their experiences with learning materials created using these AI tools. The questionnaire was carried out through the website www.webropolsurveys.com,and the respondents were reached through direct messaging via email. The survey consisted of 29 questions divided into 3 sections: demographic characteristics, organizational characteristics and questions to measure the main concern of the study. All

questions in the first and second sections were single-choice questions; 5-point Likert-type scale questions were used in the third section with 23 items. Using Cronbach's alpha, the internal consistency reliability of the survey used in this study was examined. Alpha values appear to be higher than .7, indicating a high degree of internal consistency reliability.

Table 2

Cronbach's Alpha Result

Survey	Cronbach's Alpha	N of Items
The utilization of AI-generated content	0.94	23

Note. A Cronbach's alpha value above .7 indicates acceptable internal consistency.

Based on Table 2, it can be said that all of the survey's items are generally operating well, and the survey's internal consistency reliability and item quality are both acceptable. Using Principal Component Analysis, the construct validity of the survey used in this study was investigated (PCA). Field (2005) states that the PCA's Kaiser-Meyer-Olkin measure of the analysis's sampling adequacy (KMO =.82) is acceptable. According to Field (2005), KMO values less than.50 indicate that the sample size is insufficient.

Interviews

In-depth interviews with educators, students, and instructional designers were conducted to gather qualitative data on their insights and experiences. By conducting interviews, researchers explored perceived benefits, challenges, and suggestions for improvement of curriculum, and, material designing. All interviews took place online and the average time of an interview was 30 minutes. There were three sets of question, one for the EFL teachers, one for students, and another for the instructional designer. The questions were sent to the professionals prior to the interview.

In the study's qualitative phase, a semi-structured interview with the teachers was held after the survey was administered. Eight candidates were chosen for a thorough, audio-recorded, semi-structured interview in order to achieve this goal. It is important to note that the choice to employ a semi-structured interview was made because, according to Mackey and Gass (2005), "this data collection technique allows the researcher to use a written list of questions as a guide, while still having the freedom to digress and probe for more information."

A number of factors were taken into consideration when choosing the interview subjects, including; the survey's quantitative data analysis results, the respondents' consent to continue working together; and the interview questions' relevance to the content validity index of the items, which was verified by reexamining the questions with two language and two content teachers.

The participants were interviewed in a semi-structured manner by the researchers. The purpose of the interview sessions was to gather accurate and legitimate data. In order to achieve this goal, the researchers first made the teachers feel at ease by creating a friendly environment. After introducing himself, the interviewer explained to the participants the reason for the interview, being careful not to reveal too much about the research project to prevent respondents' bias from developing.

Two language experts with PhDs in TEFL were asked to assess the appropriateness and relevance of the questions during a brief interview in an attempt to determine the reliability of the interview questions. The degree of agreement and consistency in the experts' responses was quantified and used as a benchmark for reliability. According to Ary et al. (2010), dependability increases with response consistency.

Content Analysis

A systematic content analysis of teaching materials developed using ChatGPT and DALL-E2 were conducted to evaluate the quality, relevance, and effectiveness of the content generated by these AI tools. Qualitative data was be coded and organized by using qualitative analysis software. The researchers transcribed all the qualitative data and uploaded the in transcriptions into QSR NVIVO program.

Data Analysis Procedure

I For the quantitative phase, descriptive statistics and inferential analyses examined the effect of AI-generated content on English learning achievement, L2 motivation, and self-regulated learning, teaching and designing of the participants. Statistical Package for the Social Sciences (SPSS) version 26 was used for all analyses. Descriptive statistics summarized pre-test and post-test scores for the participants of this study. Also, the research team conducted a chi-squared test to determine if there was a statistically significant association between the use of AI tools and the reported negative impacts.

For the qualitative phase data was be coded and organized by using qualitative analysis software. The researchers transcribed all the qualitative data and uploaded the in transcriptions into QSR NVIVO program version 10. The transcripts of the interviews with participants were content analyzed. In the process of content analysis, the research team examined the transcripts carefully and identified and classified themes related to interview questions into certain categories. It is worth mentioning that the researchers only reported the most repeated common and/or unique themes from participants' responses.

Results

Quantitative Results for Research Question 1

Research Question 1: In what ways can ChatGPT and DALL-E2 be effectively used as learning tools to enhance teaching content and materials?

The researchers administered a survey to educators and students, asking them to indicate whether they perceive these positive impacts as significant or not.

Table 3
Tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk)

Tests	Statistic	Df	Sig.	Statistic	Df	Sig.
pretest - content assessment	0.134	23	0.200	0.947	23	0.241
Posttest- content assessment	0.093	23	0.200	0.972	23	0.794

Based on Table3, the researchers obtained normality test results that showed that the significance value (Sig) for all data both on the kolmogrov-smirnov test and the Shapiro-wilk test > 0.05 using SPSS, it can be concluded that the distribution research data was normal.

Table 4
Descriptive statistic

Pair 1	Mean	N	Std. Deviation	Std. Error Mean
pre - content assessment	73.9382	24	11.13701	2.27742
post - content assessment	88.1467	24	9.42170	1.95116

Table 5
Paired samples test for content assessment

Mean difference	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	t (df), p
14.20	14.21	2.96	20.24	4.77	t (23) =4.7, p=0.000

Based on Table 4 and 5, the difference in a teaching content assessment to a group of educators or instructional designers from pre-test to post-test was tested with a paired samples test. the results indicated a statistically significant increase in assessment scores for a group of educators or instructional designers from pre-test (M=73.93, SD=11.13) to post-test (M=88.14, SD=9.42), t (23) = 4.7, p=.001 (two-tailed). The eta squared statistic (.48) indicated a large effect size.

Quantitative Results for Research Question 2

Research Question 2*:* In what ways may ChatGPT and DALL-E2 negatively impact education when integrated into teaching content and materials?

Collected data on the potential negative impacts identified in the study, such as depersonalization, loss of critical thinking skills, or bias concerns. The researchers administered a survey to educators and students, asking them to indicate whether they perceive these negative impacts as significant or not. Using a chi-squared test to determine if there was a statistically significant association between the use of AI tools and the reported negative impacts

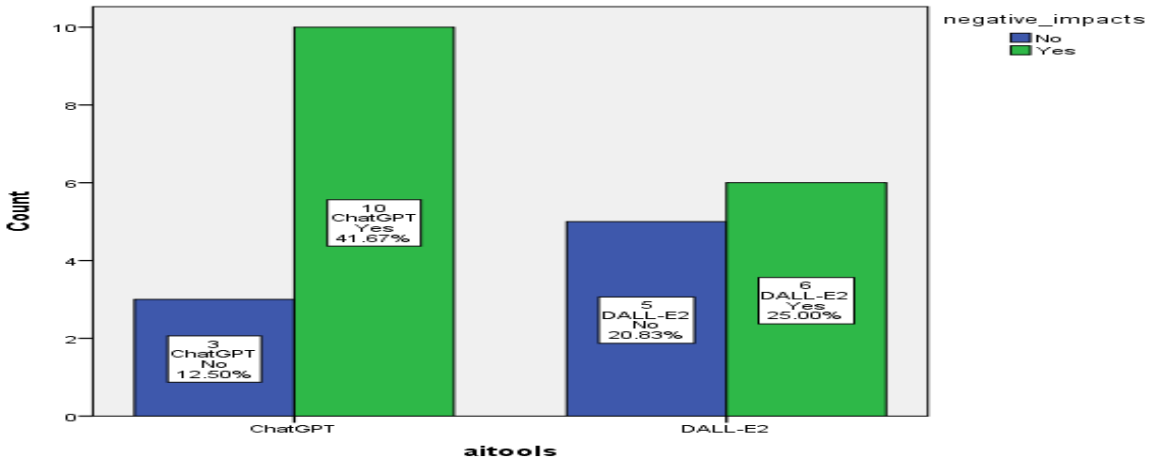

Figure3
Bar graph displaying the relation between the use of AI tools and the reported negative impacts

Table 6
AI tools negative impacts crosstabulation

AI tool	Negative impact (Yes)	Negative impact (No)	Total
ChatGPT	10	3	13
DALL-E2	6	5	11
Total	16	8	24

Table 7
Chi-square tests

Test	Value	Df	Sig. (2-tailed)
Pearson Chi-Square	1.343	1	0.247
Continuity Correction	0.524	1	0.469
Likelihood Ratio	1.349	1	0.245

Table 8
Symmetric measures

Measure	Value	Approx. Sig.
Phi	0.237	0.247
Cramer's V	0.237	0.247

The value in the second row (Continuity Correction) is used as the design is 2 by 2. The value here is .52 with a significance level of .469. The results show that there is no association between the use of AI tools and the reported negative impacts.

Qualitative Results for Research Question 1

This content analysis helps identify key themes related to how ChatGPT and DALL-E2 contribute to enhancing teaching content and materials. These themes provide insights into the practical applications and benefits of AI tools in education, which can inform educators and instructional designers on effective ways to leverage AI for enhanced teaching materials.

Table 9
Content analysis

Theme	**Example**

Content Enhancement	AI-generated content supplements traditional teaching materials, providing additional resources and perspectives. Inclusion of data-generated visuals in science presentations AI-generated case studies enriched economics content. ChatGPT and DALL-E2 enrich teaching materials by providing additional context, explanations, and resources. AI-generated explanations, supplementary materials. AI-generated historical context in history textbooks.
Personalization	AI tools customize content to meet individual learning needs. Adaptive lesson plans tailored to each student's proficiency level. Customized AI-driven math exercises for students.
Visual Aids	DALL-E2's image generation capabilities enhance visual aids, making content more engaging. Creation of unique, visually appealing infographics for history lessons. AI-created artwork for enhancing art history lessons
Time Efficiency	ChatGPT expedites content generation, saving educators time in lesson planning. Quick generation of multiple-choice quizzes for language assessments. Rapid generation of vocabulary quizzes for language classes.
Multimodal Learning	Integration of text and images fosters multimodal learning experiences. Combining textual explanations with AI-generated illustrations for geography lessons. Integration of AI-generated diagrams in science textbooks.
Enhanced Engagement	ChatGPT and DALL-E2 contribute to increased student engagement through interactive and visually appealing content. Interactive chat-based lessons, visually rich presentations. Chat-based simulations for physics lessons.
Personalized Learning	AI tools enable personalized learning experiences by adapting content to individual student needs and preferences. Adaptive quizzes, customized learning pathways. AI-adapted language exercises based on learner proficiency.
Efficiency in Material Creation	Educators and instructional designers save time and effort in creating teaching materials with the assistance of AI tools. Rapid lesson plan generation, automated content creation. Automated quiz generation for math classes.
Multimodal Content	AI-generated images and text combinations create multimodal learning experiences, catering to different learning styles. Infographics with textual explanations, image-text combinations. AI-generated visuals with textual explanations in geography materials.

Enhanced Engagement

Participants in the study highlighted the role of ChatGPT and DALL-E2 in enhancing student engagement through interactive and visually appealing content.

One of the teachers: "I noticed a significant change in how engaged my students were when we introduced ChatGPT-based lessons. The interactive conversations with the AI kept them involved throughout the class."

One of the Students: "The visuals created by DALL-E2 in our science presentations were so cool. It made learning much more interesting. I looked forward to those classes."

Personalized Learning

The study revealed that AI tools enable personalized learning experiences by adapting content to individual student needs and preferences.

One of the teachers: "ChatGPT helps me provide tailored explanations to students based on their questions. It's like having a personal tutor for each of them."

One of the students: "I like how the quizzes are different for each of us. It's not too easy or too hard. It feels like the AI knows what I need to learn."

Content Enrichment

Participants emphasized that ChatGPT and DALL-E2 enrich teaching materials by providing additional context, explanations, and resources.

One of the teachers "DALL-E2 creates these amazing images that we include in our textbooks. It adds depth to the content, and students remember it better."

One of the teachers: "ChatGPT helps me explain complex topics in a way that's easier for students to grasp. It's like having a content expert on standby."

Efficiency in Material Creation

The study found that educators and instructional designers save time and effort in creating teaching materials with the assistance of AI tools.

One of the teachers: "Creating lesson plans used to take hours. Now, with ChatGPT suggesting content and activities, it's done in a fraction of the time."

One of the instructional designers: "We used to spend weeks designing visuals for our courses. DALL-E2 generates them in minutes, and they look fantastic."

Multimodal Content

Participants discussed how AI-generated images and text combinations create multimodal learning experiences, catering to different learning styles.

One of the teachers: "The combination of text and AI-generated visuals caters to all types of learners. It's a more inclusive approach to teaching."

One of the students: "I'm a visual learner, so having these image-text combos in our materials really helps me understand the concepts better."

Improved Accessibility

Participants discussed how AI tools contribute to improved accessibility in educational content. One of the teachers: "For students with disabilities, ChatGPT-generated content that can be converted into audio formats has been a game-changer. It makes education more inclusive."

One of the students: "I appreciate the text-to-speech feature. It helps me access the materials more easily and at my own pace."

Enhanced Creativity

The study revealed that educators and instructional designers felt a kind of freedom when using AI tools.

One of the teachers: "DALL-E2 allows us to experiment with creative visuals that were previously challenging to create. It's like having a design team at our disposal."

One of the instructional designers: "We can now think outside the box. DALL-E2 sparks creativity, and we can develop content that's not just informative but also visually engaging."

Effective Reinforcement of Concepts

Participants noted that AI-generated content effectively reinforces key concepts.

One of the teachers: "After a lesson, ChatGPT generates review quizzes instantly. It's a great way for students to reinforce what they've learned."

One of the students: "The review quizzes are my favorite. They help me remember things better. It's like a quick recap of the lesson."

Real-World Applications

The study found that educators appreciate AI tools for their real-world applications in teaching materials.

One of the teachers: "We use ChatGPT to generate real-world scenarios in English language courses. It gives students a taste of what they'll face in their careers."

One of the students: "I like the real-life examples in our lessons. It helps me see how what I'm learning can be applied outside the classroom."

Continuous Improvement

Participants mentioned that AI tools offer opportunities for continuous improvement and updates in teaching materials.

One of the teachers: "One thing I love about ChatGPT is that it can stay updated with the latest information. So, our materials are always current."

One of the instructional designers: "We can make revisions based on student feedback and keep improving our content. AI tools facilitate this iterative process."

These qualitative results illustrate how ChatGPT and DALL-E2 are perceived as valuable tools for enhancing teaching content and materials, fostering engagement, personalization, content enrichment, efficiency, multimodal learning experiences, improved accessibility, enhanced creativity, effective concept reinforcement, real-world applications, and opportunities for continuous improvement.

Qualitative Results for research question 2

This content analysis offers insights into the potential negative impacts of integrating ChatGPT and DALL-E2 into teaching content and materials, including concerns about reduced critical thinking, loss of human interaction, information overload, technology dependence, and ethical considerations. These findings underscore the importance of responsible and balanced use of AI tools in education.

Table 10
Content analysis

Theme	Example
Reduced Critical Thinking	Concerns were expressed that overreliance on AI-generated content may lead to reduced critical thinking skills among students. Students relying on AI for answers without actively engaging in problem-solving.

	Students relying solely on AI-generated answers.
Loss of Human Interaction	Participants highlighted concerns about AI tools potentially diminishing valuable human interactions in educational settings. Reduced face-to-face discussions due to increased reliance on AI-generated content. Decreased in-person interactions in the classroom.
Information Overload	Participants discussed the risk of AI-generated content contributing to information overload for both educators and students. Overwhelming volumes of AI-generated content leading to confusion. Students overwhelmed by excessive AI content.
Dependence on Technology	Concerns were raised about students becoming overly dependent on technology for learning. Students feeling incapable of completing assignments without AI assistance. Students feeling unable to work without AI help. Participants further discussed the risk of students becoming overly dependent on technology for learning. Students relying solely on AI tools for research instead of exploring traditional resources. Students feeling unable to work without AI help.
Ethical Concerns	Ethical concerns related to AI-generated content, such as issues of bias and accuracy, were highlighted. Instances of AI-generated content inadvertently promoting biased perspectives. AI-generated content inadvertently promoting bias.
Erosion of Creativity	Participants expressed concerns about AI-generated content potentially stifling creativity in both educators and students. AI-generated assignments that limit students' opportunities for creative expression.
Technological Glitches	Concerns were raised about potential technological glitches affecting the learning process. Disruptions in lessons when AI tools encounter technical issues. Disruptions in lessons due to AI tool issues.
Reduced Real-Life Application	Some participants mentioned concerns that an overemphasis on AI-generated content might reduce the application of knowledge to real-life situations. Students failing to connect theoretical concepts to practical scenarios. Failure to connect concepts to real-life scenarios.
Unequal Access	Participants highlighted concerns about unequal access to AI tools, potentially exacerbating educational disparities. Students in resource-limited settings lacking access to AI-enhanced materials. Students lacking access to AI-enhanced materials.

Loss of Human Interaction

Participants expressed concerns about the potential negative impact of AI tools on human interaction in educational settings.

One of the teachers: "While AI is helpful, I worry that it might replace valuable human interactions in the learning process. Building teacher-student relationships is essential."

One of the students: "Sometimes, I miss the personal touch of a teacher. ChatGPT is great, but it's not the same as having a real conversation with someone."

Overreliance on AI

The study revealed concerns about students becoming overly reliant on AI tools for learning.

One of the teachers: "I've noticed some students becoming too dependent on ChatGPT for answers. They're not putting in the effort to think critically."

One of the students: "It's tempting to rely on ChatGPT for everything. I'm worried it might make me lazy in the long run."

Ethical Concerns

Participants discussed ethical concerns related to AI-generated content, including issues of bias and accuracy.

One of the teachers: "AI can inadvertently introduce bias into content. We need to be cautious about the information it provides."

One of the instructional designers: "Accuracy is a concern. We've encountered instances where AI-generated explanations were incorrect, which could mislead students."

Privacy and Data Security

Concerns were raised about the privacy and data security implications of AI tools in educational settings.

One of the teachers: "Using AI tools means sharing student data. We must ensure that it's handled securely and ethically."

One of the students: "I worry about my data being used without my consent. It's important that our privacy is respected."

Reduced Creativity

Participants expressed concerns that AI-generated content might stifle creativity in both teachers and students.

One of the teachers: "There's a risk that we might rely too heavily on AI's creativity. It could limit our own creative thinking and expression."

One of the students: "I miss the creative assignments we used to have. Now, it feels like everything is generated by a machine."

Information Overload

Participants raised concerns about AI-generated content contributing to information overload for both educators and students.

One of the teachers: "There's so much content generated by ChatGPT that it can be overwhelming. It's challenging to sift through it all."

One of the students: "Sometimes, there's just too much to study. It's like drowning in information."

Lack of Critical Thinking

The study revealed concerns about AI tools potentially discouraging critical thinking skills.

One of the teachers: "With AI providing quick answers, students might skip the process of thinking critically and problem-solving."

One of the students: "Why bother thinking when ChatGPT can answer everything? It's making us lazy thinkers."

Dependence on Technology

Participants discussed the risk of students becoming overly dependent on technology for learning.

One of the teachers: "I've seen students struggle when they don't have access to AI tools. It's like they can't function without them."

One of the students: "I panic when I can't use ChatGPT for homework. It's like my brain has forgotten how to do research."

Technological Glitches

Concerns were raised about potential technological glitches affecting the learning process.

One of the teachers: "Sometimes, ChatGPT crashes, and it disrupts the entire lesson. We need reliable technology."

One of the students: "It's frustrating when ChatGPT doesn't work. I feel like I can't complete my assignments."

Teacher Adaptation

Participants discussed the need for teachers to adapt to AI integration.

One of the teachers: "Integrating AI tools requires training and adaptation. Some educators may struggle to keep up with the technology."

One of the instructional designers: "We need to ensure that educators are well-prepared to use AI tools effectively. It's a learning curve for many."

These qualitative results shed light on the potential negative impacts of integrating ChatGPT and DALL-E2 into teaching content and materials, including concerns about reduced human interaction, overreliance on AI, ethical considerations, privacy, potential limitations on creativity, information overload, potential erosion of critical thinking skills, dependence on technology, technological glitches, and the need for educators to adapt to the integration of AI tools. These findings highlight the importance of responsible and balanced use of AI tools in education. These findings emphasize the importance of carefully addressing these issues when incorporating AI into education.

Discussion

The analysis reveals that both educators and students perceive ChatGPT and DALL-E2 positively in terms of the perceived effectiveness of AI-generated content, personalization and adaptation, immediate feedback, engagement, and interactivity, as well as their value as supplementary learning resources. The relatively low standard deviations indicate a consistent positive perception among participants.

The findings from the current investigation provide valuable insights into the ways in which ChatGPT and DALL-E2 can serve as effective learning tools to enhance teaching content and

materials. This discussion will explore these findings in detail and their implications for educational practice.

The survey results reveal a strong consensus among both educators and students regarding the effectiveness of AI-generated content. This alignment underscores the potential of AI tools in improving the quality and impact of teaching content. It corroborates previous research (Rai & Sarkar, 2021) that highlighted the promise of AI in generating high-quality, engaging text.

These findings align with studies by Li et al. (2021) and Thorne et al. (2019), which demonstrated the effectiveness of AI-generated content in improving grammar, vocabulary, and pronunciation skills in language learning. The positive perception of AI-generated content highlights its applicability across various subjects and learning contexts.

Teachers rated the personalization and adaptation capabilities of AI tools, indicating a strong belief in their ability to tailor content to individual student needs. Students, while slightly more reserved, still express a positive perception in this aspect. This aligns with the findings of personalized learning studies (Dhawan, 2021), emphasizing the importance of adapting teaching materials to match students' proficiency levels and learning paces. The potential for personalization resonates with the educational community as it addresses the challenge of catering to diverse learning styles and abilities. AI tools like ChatGPT and DALL-E2 can provide tailored content that meets the unique requirements of each learner, promoting more effective and inclusive education.

The findings of current study are in accordance with previous studies. Li et al. 2021 that showcased the effectiveness of AI-generated content in enhancing learning materials. The ability to create additional explanations, case studies, and real-world examples enriches the educational experience, providing students with a deeper understanding of the subject matter.

Both educators and students express concerns about the depersonalization of learning due to the integration of AI tools. This concern aligns with existing literature (Dhawan, 2021), which highlights the risk of reducing the personal connection between educators and students when technology takes center stage.

The survey results indicate apprehensions about the potential loss of critical thinking skills. This aligns with concerns raised in educational circles (Dhawan, 2021) about over-reliance on AI-generated content potentially diminishing students' ability to think critically and solve complex problems independently. To mitigate this potential negative impact, educators must design learning experiences that complement AI tools by encouraging critical thinking, creativity, and problem-solving. AI should be viewed as an aid rather than a replacement for these vital cognitive skills.

Both educators and students identify quality control challenges as a concern. Maintaining the quality of AI-generated content is a genuine challenge, as indicated by previous research (Dhawan, 2021). Ensuring that AI-generated materials meet educational standards is imperative.

Institutions and teachers should establish robust quality assurance processes for AI-generated content, which includes continuous monitoring, evaluation, and feedback mechanisms. This can help address quality control challenges and maintain the integrity of educational materials.

Students express concerns about technical challenges and dependence on AI tools. This reflects the potential risk of overreliance on technology without developing essential learning skills independently. To address this, educators can use AI tools as aids for learning rather than replacements. They should foster a balanced approach that encourages students to develop a broad skill set, including technology literacy alongside critical thinking and problem-solving skills.

Both educators and students express concerns about the potential loss of educator expertise. This concern may stem from the fear that AI tools could replace educators in certain aspects of teaching. To counter this, educators should view AI as a complement to their expertise rather than a substitute. They can leverage AI tools to streamline administrative tasks, allowing more time for personalized instruction and mentorship.

Conclusion

The exploration of the integration of ChatGPT and DALL-E2 into teaching content and materials has revealed a nuanced landscape of potential benefits and concerns. This research sought to investigate both sides of this integration to provide a comprehensive understanding of its impact on education. Based on the quantitative analysis, it can be inferred that ChatGPT and DALL-E2 are viewed favorably as effective learning tools that enhance teaching content and materials. Their positive reception across various parameters suggests their potential to positively impact education when thoughtfully integrated. the survey results shed light on concerns regarding the integration of ChatGPT and DALL-E2 into teaching content and materials. While these AI tools offer significant benefits, they also pose potential negative impacts related to depersonalization, loss of critical thinking skills, quality control challenges, bias, ethical considerations, technical challenges, and educator expertise

Our findings align with previous research, highlighting several positive impacts of incorporating AI models like ChatGPT and DALL-E2 into education. Educators and students recognize the potential of these tools to enhance teaching materials, personalize learning experiences, provide immediate feedback, and foster engagement and interactivity. Moreover, they acknowledge the value of AI-generated content as supplementary learning resources. These

positive perceptions underscore the potential of AI integration to improve the quality and effectiveness of educational practices.

The findings of this study carry significant implications for educational practice. Educators and institutions must carefully consider the use of AI tools as part of their pedagogical strategies. While AI can undoubtedly enhance content delivery, personalization, and engagement, it should be employed thoughtfully to mitigate potential negative impacts. The survey results strongly suggest that ChatGPT and DALL-E2 hold great promise as learning tools to enhance teaching content and materials. The positive perceptions of educators and students regarding their effectiveness, personalization capabilities, immediate feedback, engagement, and value as supplementary resources highlight their potential to positively impact education. Further research and practical implementation are vital to unlocking the full potential of these AI-driven tools in education.

In conclusion, the survey results suggest that there are concerns among both educators and students regarding potential negative impacts of integrating ChatGPT and DALL-E2 into teaching content and materials. These concerns encompass depersonalization, loss of critical thinking skills, quality control challenges, bias, ethical considerations, technical challenges, and potential loss of educator expertise. Addressing these concerns is crucial when integrating AI tools thoughtfully into education. Further research and practical implementations are needed to develop strategies to mitigate these potential negative impacts.

The study findings have significant implications for educational practice. ChatGPT and DALL-E2 can be harnessed to enhance teaching content and materials across a spectrum of subjects and educational levels. The ability to generate personalized, engaging, and interactive

content with immediate feedback can empower educators to create more effective learning experiences.

However, while these findings are promising, it is essential to proceed thoughtfully. Educators must receive training and support in effectively integrating AI tools into their teaching strategies, addressing potential challenges such as content quality control and ethical considerations.

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