

Case Report

# Prompt: ChatGPT, Create My Course, Please!

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**Abstract:** The introduction of ChatGPT for public use has generated increasing interest among educational researchers in evaluating the utility of artificial intelligence (AI) in pedagogical settings. This study aims to contribute to this growing body of research by developing an entire course curriculum and lesson plans exclusively using ChatGPT. Case study findings support many of the affordances and limitations observed in previous studies, such as identifying appropriate topics and subtopics for lessons, as well as identifying the occurrence of hallucinations that fabricate data. This study also revealed new limitations in the design capabilities of ChatGPT. Specifically, lessons are designed as standalone units of information. Unlike human educators, AI lacks the ability to integrate prior lessons with current learning experiences or strategically prepare students for future learning outcomes. Understanding these affordances and limitations allows ChatGPT to be a useful tool for educators engaging in instructional design.

**Keywords:** AI; ChatGPT; curriculum design; lesson planning; teachers

## 1. Introduction

Despite the long history of innovation in artificial intelligence (AI) that dates back to the 1950s, open access to AI tools for the public did not become readily available until the launch of OpenAI's chatbot, ChatGPT, in November 2022. This publicly available AI system is not only a tool for the general public but also for educational researchers who previously had limited access to such tools. In terms of access, Zawacki-Richter et al. (2019) [1] conducted a systematic review of AI applications used in higher education research and found 146 papers that met the inclusion criteria and were published between 2007 and 2018 in peer-reviewed journals. The peak years for publication were 2017 (20 articles) and 2018 (23 articles), which were approximately twice the average number of articles published from 2007 to 2016. Zawacki-Richter et al. (2019) [1] also analyzed related research by categorizing the affiliations of the first authors. Computer science (61) and science, technology, engineering, and mathematics (STEM) departments (29) were the most common first-author affiliations, while education, including dual affiliation, was responsible for only 13 published articles.

However, following the introduction of ChatGPT in November 2022, educators presumably had easier access to AI for research purposes. A rapid review conducted by Lo (2023) [2] focused only on educational studies researching ChatGPT was published in April 2023. The search for relevant articles spanned January and February 2023, and after the inclusion criteria were assessed, a total of 50 studies were retained for analysis. Although the author excluded nonacademic articles, the rapid review strongly suggested that ChatGPT has made AI more accessible for educators to conduct research. We compared the 13 published articles of Zawacki-Richter et al.'s (2019) [1] systematic review from 2007 to 2019 to Lo's (2023) [2] rapid review that included 50 published articles two to three months after the launch of ChatGPT; access may have been a barrier for educational researchers.

Now that AI is more accessible to educators, additional research is being conducted to help educational researchers understand how AI, or ChatGPT, can be used in educational



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settings. Researchers are exploring the benefits of AI for learning and documenting the limitations of the technology. Therefore, the purpose of this research is to design an entire course with AI to evaluate whether graduate students can detect whether the course and associated lessons were generated using AI and assess both the affordances and limitations of using ChatGPT and tools powered by ChatGPT exclusively for course and lesson plan design.

## 2. Literature Review

### 2.1. AI in Education

Artificial intelligence (AI) is not a new technology but rather one that has been in development since the 1950s when Turing (1950) [3] asked, ‘Can machines think?’ (p. 433). However, the idea that a machine can be ‘intelligent’ and resemble human intelligence is somewhat of a misnomer. AI consists of complex language models that generate outputs based on mathematical algorithms and predictive techniques rather than exercising intelligence as humans understand it [4]. The Turing test, initially termed the ‘imitation game’ by Turing (1950) [3], measures whether a machine can exhibit behavior indistinguishable from human intelligence. For a computer to pass such a test, the machine would have to be programmed with the ability to engage in natural language communication, retain and utilize acquired knowledge, draw new conclusions from stored information, and recognize patterns within the data [5].

The advancement of a ‘thinking machine’ capable of meeting these criteria could benefit not only students but also educators. In the traditional classroom, teachers are responsible for developing lessons, managing the classroom, delivering instruction, and providing feedback to large numbers of students in a timely manner [6]. Hence, AI can be seen as a viable tool for helping teachers. This technology could alleviate some administrative and time-consuming tasks, such as grading, thereby freeing educators to focus on the individual needs of their students. However, some teachers may find the implementation of AI technology to be overwhelming, challenging, and potentially more time-consuming during the initial learning phase [7]. Therefore, AI should be considered a tool that requires proper acclimation and training.

### 2.2. Strengths and Weaknesses of AI in Education

Much of the focus on designing AI for educational settings has been directed toward teachers because they set course goals and instructional objectives. Even in student-centered learning environments, teachers define the parameters that guide the instruction process [8].

Advances in AI technology have expanded the range of tasks that can be automated, increasingly replicating responsibilities traditionally held by teachers. Some advantages for teachers using AI include assisting in lesson planning [9], performing automated assessments to reduce workload [10], providing immediate feedback to students [11], and using real-time analytics to assist with student learning [12].

Nevertheless, there are limitations to using AI technology. Issues such as concerns about the credibility of AI outputs [13], the lack of specialized training to teach with AI [14], challenges related to AI’s ability to evaluate content logic [15], its lack of common sense [8], and the inability to replicate the social–emotional support typically provided by human teachers [16].

While all technologies possess strengths and weaknesses, assessing AI presents unique challenges because there is no common AI platform available for all researchers to use. Therefore, the introduction of ChatGPT has provided researchers with a common platform, allowing for assessments that yield more generalizable results.

### 2.3. Strengths and Weaknesses of ChatGPT

ChatGPT is an emerging technology that provides educational researchers with the opportunity to explore the potential applications and benefits of AI technology. Two recent releases, ChatGPT-3.5, released in November 2022, and its subsequent upgrade, ChatGPT-4,

in March 2023, have provided different access capabilities. The earlier version (3.5) is currently free for all users, but the more advanced version (4.0) requires a monthly subscription of USD 20. Unfortunately, most related research fails to distinguish between the versions for interventions or analyses, which may impact the comparability and generalizability of the findings.

A strengths, weaknesses, opportunities, and threats (SWOT) analysis conducted by Farrokhnia et al. (2023) [17] on ChatGPT 3.5's utility in educational contexts revealed that the platform could generate real-time responses that are both coherent and contextually relevant, simulating natural human conversations. However, the study also suggested certain limitations, such as a lack of deep understanding and higher-order cognitive skills, the ability to evaluate the quality of ChatGPT outputs, and the potential for algorithmic bias. Another SWOT analysis by Zhu et al. (2023) [18], which presumably focused on ChatGPT 3.5, also supported Farrokhnia et al.'s (2023) [17] assertions about the system's ability to generate conversationally plausible responses. Moreover, Zhu et al. (2023) [18] emphasized that ChatGPT could offer expert solutions to complex tasks, replicate human-like writing styles, and assess task performance while providing feedback. Like Farrokhnia et al. (2023) [17], Zhu et al. (2023) [18] found evidence that some of the outputs were inaccurate, fabricated, or biased, and that there was a lack of critical or in-depth thinking about the outputs.

In a direct comparison of ChatGPT-3.5 and ChatGPT-4, Karakose et al. (2023) [19] noted that both versions maintained some similarities, but there were some differences. According to the authors, both models demonstrated equivalent accuracy with respect to information output but noted nuanced variations in the way they defined certain terms. For example, ChatGPT-3.5 defined 'digital leadership' with an emphasis on the teaching-learning process, whereas ChatGPT-4 focused on the integration of digital leadership with school management. Likewise, similar responses were generated in relation to information on digital leadership skills and the principal's digital leadership on teachers' technology integration. However, when asked to generate information on teachers' technology integration, ChatGPT-3.5 tended to offer more superficial insights than ChatGPT-4, which provided broader and more complete responses. The results suggest that the greatest difference might lie in the ability of ChatGPT-4 to generate slightly more comprehensive outputs.

#### 2.4. Research Questions

This case study aimed to use ChatGPT to create curriculum topics and lesson plans for a course focusing on AI and education for graduate school students. The research questions for this case study are as follows:

RQ1: What are the students' perceptions of the quality and relevance of the course content when they are unaware that it is AI-designed?

RQ2: What are the affordances and limitations of AI-developed courses and lesson designs?

### 3. Methods

#### 3.1. Research Method

The current study employs a case study methodology, an empirical approach suitable for the in-depth investigation of contemporary phenomena within their real-world context [20]. Case studies can focus on various subjects, including specific situations, events, programs, and phenomena. Because this research aims to understand the complexities of a course designed with AI, a single case study is an appropriate methodology within the qualitative research paradigm. This research defines a graduate course as a single case study focusing on the professor and three study participants.

#### 3.2. Participants and Research Context

The participants in this study were three graduate students, one in a master's program and two in a doctoral program enrolled at a university in southwest Korea. The class was designed for all graduate students in the Department of Education, but only students study-

ing Educational Technology registered for the course. The age range of the participants spanned from the mid-thirties to late forties, and all had prior professional experience in educational settings. The course title was ‘AI and Education’, and it focused on how AI works and how it could be used in education. Classes were scheduled at night and lasted three hours.

### 3.3. Course Content and Development

To study the AI design of a course, all topics taught during the semester were generated through prompts in ChatGPT. Several iterations of prompting were conducted to generate the course topics. The second query, ‘What are 12 topics, with brief descriptions, that provide practical information for graduate school educators to learn about AI in education?’, was chosen. The other prompts were slightly altered in language, and the topics generated were not significantly different. The topics for the course were *introduction to AI in education; AI and personalized learning; chatbots and virtual assistants; adaptive assessments; computer vision; data analytics; natural language processing; educational gaming; intelligent tutoring systems; social robotics and emotional intelligence; ethics of AI in education; and the future of AI in education*. The topics were taught in this generated order to assess whether the students noticed any potential incoherencies with the topics.

The content for each topic was developed through ChatGPT for the first half of the semester and through an AI teacher website (app.teachersbuddy.com) and ChatGPT during the second half of the semester. Table 1 shows the content generation of the lesson plans with ChatGPT in the first part of the semester and teachersbuddy for content generation in the second part of the semester.

**Table 1.** Content generation for lesson plans.

First Half: ChatGPT Only	Initial Search	Follow-Up	Expand (Multiple)	
	Two- and half-hour constructivist lesson	Create a speech for the content (ChatGPT-3.5)/Provide more details (ChatGPT-4)	Provide more details/examples of information	
Second half: AI-T and ChatGPT	Initial search	Follow-up	Expand (multiple)	Develop further
	Brainstorm topics in AI-T	Create lesson plan with brainstorming topics and Fink’s Taxonomy of Significant Learning	Use slide content generator and enhanced slide content to expand information	Use ChatGPT to provide more details/examples for the enhanced information

When using ChatGPT during the first part of the semester, the researchers had to prompt the creation of a lesson plan and then use an iterative process of asking ChatGPT to provide additional details. Prompts were created, such as ‘Create a 2-hr constructivist lesson plan with detailed information and three interactive activities for graduate students on this topic: [topic information from the original ChatGPT topic inquiry]’. Follow-up prompts changed during the lessons created with ChatGPT 3.5 and ChatGPT 4. With version 3.5, the prompt to generate additional detailed information was ‘Prompt: Create a 20-min, detailed talk on this information: [topic focus]’. However, with version 4, the prompt was simplified by asking ‘Prompt: Provide more detailed information on this topic: [topic information]’. However, with teachersbuddy, prompts were provided on the backend of the application, and follow-up prompts were provided for information from the ChatGPT 4 input.

### 3.4. Data Collection and Analysis

The data were collected during the spring semester of 2023. Before participating in the study, participants completed and signed a consent form. Two types of research data were collected: (1) each participant's early-semester and end-of-semester individual interviews and (2) each participant's four reflection journals throughout the semester. The individual interviews were conducted in real time using the Zoom platform, and their reflection journals were collected using Google Drive. The interviews were conducted in Korean, and the second author translated the survey into English.

In data analysis, thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within qualitative data [21]. We adopted Bruan and Clarke's (2014) [22] six phases of thematic analysis. Specifically, as the first step, the researchers transcribed all the interview data and organized the interviews on Google Drive. Second, the researchers developed the first coding scheme for the initial process. Third, topics and subtopics were found and classified. Fourth, the data set was classified and more concretely analyzed by discussion with the researchers. Fifth, the analysis was named and defined in detail. Sixth, based on the analysis, the findings section was written.

### 3.5. Background Information of Study Participants

There were three participants in the course. For participants' anonymity, this paper referred to Students A, B, and C. Please see Table 2 for the background information of the study participants.

**Table 2.** Study participants' background information.

	Student A	Student B	Student C
Professional Background	Middle School English Teacher	High School English Teacher	University IRB Officer
Degree Background	English Education	English Education	Psychology
Current Major	Educational Technology	Educational Technology	Educational Technology
Degree Sought	Ph.D.	Master's	Ph.D.

## 4. Results

**RQ1: What are the students' perceptions of the quality and relevance of the course content when they are unaware that it is AI-designed?**

The themes of the data analysis were divided into four categories: (1) attitudes and perceptions of the course materials, (2) noticed changes in the course materials, (3) competency in AI application, and (4) overall course experience.

### 1. Perceptions of the course materials

Regarding their attitudes and perceptions of the course materials, all the participants agreed that the content was well-organized and easy to understand. As such, their attitudes and perceptions of the course materials were positive overall. Some examples are mentioned in their reflection notes:

In terms of curriculum design, the content was designed to stimulate motivation or actual interest before the lesson compared to previous sessions. This content increased interest and focus in the lesson, and the connection to the lesson seemed seamless (extracted from Teacher B's reflection notes).

With respect to delivery methods, the content matches well with the expectations of every lesson. They contain the main points briefly and in an understandable way (extracted from Teacher C's reflection notes).

Most participants liked how the professor conveyed the course materials during the interviews. Here is another example.

The professor provided sufficient information in the course on the PPT slides, making it easy for me to catch up. My English was not good, so I thought it could be challenging to follow the lecture at the beginning of the semester. However, I could receive sufficient background information from the course materials, so it was good for me to follow up (Teacher C, second interview).

## 2. Noticed changes in the course materials

Among the three participants, Teacher A noticed critical changes in the course materials during the semester. Specifically, Teacher A noted the changes in the content displayed because she thought the first and second halves of the PPT slides looked very different. The following is the part of the transcript from her second interview.

In the second half of the course, I noticed that the PPT materials were changed. In the first half of the semester, I felt like the professor made those PPT slides by himself. However, in the second half of the semester, the content display and formatting were changed and different. Thus, I thought the professor used the AI tool for course PPT slides for reasons. . . I'm not too fond of the second half of the PPT slides because. . . AI tools created those (Teacher A, second interview).

In the reflection note, Teacher A mentioned the following:

Week 11 and 12: The PPTs could disrupt the course flow and make it harder for me to grasp the material. The PPTs seemed to be made by AI, not by my professor (extracted from Teacher A's reflection notes).

On the other hand, the other two participants did not notice changes in the content displayed in the course materials. The authors mentioned that the background of the PPT slides was slightly changed, but the content display and delivery methods were not changed.

In the second half of the semester, the background and format of the PPT slides were changed, but this did not impact my understanding of the content. Additionally, the professor told us that he was using the AI tool to create the PPT background, so this was okay (Teacher B, second interview).

The first half of the semester is mainly arranged with sentences. The second half of the semester consists of more diverse and concise designs and pictures, which are good for understanding. Both designs are appropriate for the curriculum because, in the early phase of the semester, we need to familiarize ourselves with the lesson, so we need more detailed written explanations (extracted from Teacher C's reflection notes).

It is concluded that each participant has different opinions and experiences of changes in content and materials based on their understanding and experiences of the course.

## 3. Their confidence in AI applications

All three participants mentioned that their self-confidence could be enhanced when comparing their competency level in the early semester and at the end of the semester. However, previous backgrounds and skills related to AI impact the actual ability of AI applications in their classrooms. Specifically, participants with previous background knowledge and skills in AI, such as Teacher C, showed high competency.

I am fairly confident in working with AI applications. I would say 8 out of 10 scale in competency levels. My previous experience developing apps and tools helped me get better ideas for what I will do for my future research projects. I am working on making apps to help university applications for high school kids, so the course helped me build new ideas and make them real for final assignments. I am enjoying it now (Teacher C, second interview).

However, other participants who lacked previous background knowledge and skills in AI showed low competency. For instance, Teacher B, who has low competency, mentioned in the interview:

I thought I was at the beginner level of AI application, so my competency in AI application was not that high. What I can do is create a lesson plan that incorporates AI components more effectively. However, I need somebody's help making AI technology in

real practice. So, I wish I could create something new, like app development for the final project assignment, but it was challenging now (Teacher B, second interview).

Some teachers' reflection notes also showed a lack of competency in practical AI applications.

I can understand what AI is, how it works, and how it can have an impact on society. However, as a teacher, I still struggle to design and apply AI systems as pedagogical tools for my lessons (extracted from Teacher A's reflection notes).

It is concluded that based on the previous knowledge, expertise, and experience of AI applications, each individual participant's competency in AI applications could differ.

#### 4. Overall experiences while taking the course

Regarding overall course experiences, all participants agreed that the course environment was learner-friendly and encouraged a collaborative learning process. Additionally, the professor effectively facilitated the participants' in-class activity and participation. Thus, all of them are quite satisfied with the course. Some examples are below.

I liked the classroom atmosphere because we were working together during the course, and it was like American higher education with a small number of graduate students. I prefer this kind of course format because I do not like lecture-only classes in the programs with other courses. I like to receive hands-on activities and assignments that I could use for my teaching classrooms (Teacher A, second interview).

This course was one of the practical courses we took from teacher preparation programs. We took the lecture part and had enough chance to work on collaborative or individual projects afterward. It was an encouraging learning environment that we all enjoyed (Teacher B, second interview).

#### *RQ2. What are the affordances and limitations of AI-developed courses and lesson designs?*

All course information, including course topics, lesson content, midterm projects, and final projects, was created with AI. Although the content was created by AI, there was an iterative process of refinement through prompts to elaborate on the existing information. This process concentrated on developing existing information rather than explicitly requesting new information that the instructor identified as potentially relevant but not initially provided by AI.

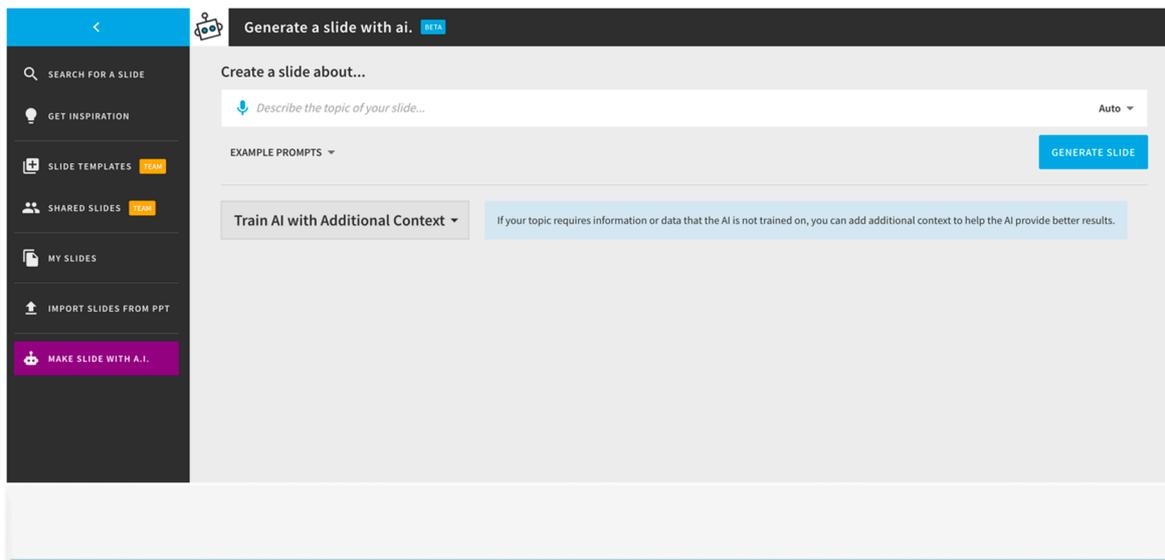
##### 4.1. AI Affordances

To assess the quality and coherence of topics generated by ChatGPT, four distinct queries were conducted, each requesting twelve topics. All four outputs consistently featured lessons on chatbots and virtual assistants, natural language processing, and learning analytics, among others. However, there were some minor differences in some of the outputs. For example, the first query separated machine learning and deep learning into separate lessons, whereas the second query incorporated this information into the first lesson (introduction to AI in education) and the second lesson (AI and personalized learning). Although machine learning and deep learning are important aspects of AI, dedicating entire lessons to these topics was not suitable for educators. Instead, these subjects were integrated into other topics. The four different queries generated topics that were appropriate and met the expectations for a course focused on AI and education with education majors.

Another affordance offered by AI was the ability to generate subtopics within the theme of each lesson. During the first part of the semester, ChatGPT 3.5 and 4.0 were able to generate topic information by prompting them to create a constructivist lesson plan. In the second part of the semester, the teachersbuddy website's 'brainstorming' feature offered numerous potential subtopics for the main subject. Similar to generating 12 topics for the course, generating subtopics for each specific lesson was comprehensive and coherent.

Finally, an additional AI-based program designed for presentations (beautiful.ai) was used in tandem with teachersbuddy and ChatGPT in the second half of the semester. The AI-generated content from teachersbuddy and ChatGPT was placed inside the 'AI

slide generator bot' of beautiful.ai to create the slides. This bot could discern important information from short paragraphs, reducing the time required for manual slide preparation from approximately five hours per lesson to just one hour. Additionally, suitable images and icons were selected from an AI comprehensive library of professional resources. AI was able to summarize text into key points, create an appropriate slide design (bullet points, paragraphs, timelines, text boxes, etc.), and identify pictures and icons that matched the idea of the point being explained. Figure 1 shows the AI generator bot and a sample output.



## The Advantages of ITS



### Personalized Learning

ITS allows students to work at their own pace and receive feedback specific to their learning needs.



### Immediate Feedback

ITS provides instant feedback to learners, allowing them to correct errors and misconceptions quickly.



### Progress Tracking

ITS can track a student's progress over time, providing teachers with valuable data.

**Figure 1.** AI generator bot and output example.

When creating a new course with no prior content, both ChatGPT and teachersbuddy allow designers to identify the key topics and relevant information. Generally, designers spend days or weeks searching for different resources on the Internet or in the library to collect materials. AI can streamline the process to a single day. For designers who are already familiar with the subject matter, ChatGPT can turn the laborious process of searching for information into a more efficient exercise of recognition, making the process quicker and less cognitively demanding. In addition, AI-powered slide generators not only save time but also enhance the visual quality of the presentations.

#### 4.2. AI Limitations

Despite these advantages, there are inherent limitations associated with using AI for course and instructional design.

One primary constraint for AI is effective prompting. When using ChatGPT, prompting is essential for generating desired outputs. This becomes particularly important when newer versions of AI software are released, as each version may require changes in prompting strategies. For example, ChatGPT-3.5 and ChatGPT-4.0 generated lesson plans with bullet points but differed significantly when expanding on that information. In version 3.5, the AI had to be prompted to discuss the information as if it were giving a presentation, whereas in ChatGPT-4, simple prompts to request that the AI expand on the output provided more detailed information. The presentation prompts of ChatGPT-3.5 did not work as well with ChatGPT-4. When using ChatGPT, the details of the prompts and the version used are important factors for extracting the desired information. Teachersbuddy.com offered less control over prompts than ChatGPT, making it less flexible, but it allowed inputs, such as age group or educational methodology.

Another limitation is the potential for outdated or inaccurate information. When using ChatGPT, users are informed that the AI system's training data will extend only up to September 2021, limiting its ability to offer current updates in technology. Moreover, the AI approach generated false research articles by well-known authors and journals in the field with complete DOI numbers. These inaccuracies made it unsuitable for finding external reading materials for graduate-level coursework. The risk of outdated or incorrect information was an issue when using AI to generate lesson plans and activities.

Finally, the most significant challenges associated with using AI-generated lesson plans were the lack of depth of information provided by iterative prompting and the propensity to generate the same information. Throughout the semester, AI consistently incorporated the same generic sections on ethics and inclusivity when covering any aspect of AI and education. Ultimately, the further the course went into the semester, the more the information became repetitive. The teachersbuddy website exhibited similar limitations, requiring additional iterations through ChatGPT to add depth, only to result in repetitiveness. Therefore, from a designer's perspective, the depth of information about the subject and how it connects with other topics was not expansive. AI appeared unable to connect present information with past and future information, a skill that human educators naturally possess.

#### 5. Discussion

The use of AI for course design and instructional design offers potential benefits for educators but also has several limitations that warrant consideration. From the student perspective, satisfaction with the course content was high, and the course was considered well-organized. The only issue expressed was not the content itself but rather the use of beautiful.ai, which created more dynamic slides than conventional PowerPoint presentations. The lack of critical assessment of the course content suggests that students might be able to evaluate their experience in the course [23], but they might not have the capacity to properly evaluate the curriculum [24]. Student assessments often include factors such as the approach to learning, the academic environment, and instructional theories held by teachers [25]. These elements matched comments such as 'American higher education' (Teacher A) or 'collaborative or individual projects' (Teacher B). Korean graduate students viewed the content and teaching of this course from their prior experiences as learners; although two were in-service educators, curriculum design and instructional design were not assessed through the lens of a teacher or designer. Notably, the students did not seem to notice the redundancy of information presented across multiple lessons.

From the educator's perspective, some of the findings aligned with previously reported affordances and issues. ChatGPT-3.5, ChatGPT-4, and teachersbuddy, which used ChatGPT (version unknown), were able to identify appropriate topics and subtopics for the course and create detailed lesson plans. This finding aligns with Zhu et al. (2023) [18]. The

authors found that ChatGPT could create a long-term and detailed lesson plan that would be appropriate for a course and customized to meet the learner's needs. Both versions of ChatGPT can greatly reduce the workload of educators, and Kersting et al. (2014) [10] suggested that this was a benefit of AI in education. These affordances allow the educator or designer to minimize the amount of time spent outlining and identifying internal structures. Although this approach is not perfect and requires careful assessment, both versions of ChatGPT are sophisticated enough to dramatically reduce workload and time commitment.

These research findings also support issues identified in previous research, such as incorrect or completely fabricated data [18] and a lack of understanding or depth when elaborating on information [17,18]. Although ChatGPT excels at structuring information, it may lack depth and is susceptible to generating repetitive or inaccurate content. For educators or designers who are well-versed in their subjects, identifying these limitations will be straightforward. Individuals who lack experience or advanced knowledge may need to exercise a required skepticism when reviewing ChatGPT outputs.

Finally, this research identified two limitations that are seldom discussed with respect to ChatGPT. First, ChatGPT-3.5 and ChatGPT-4 may require different prompts for effective information retrieval. Karakose et al. (2023) [19] noted that ChatGPT-3.5 was broader and that ChatGPT-4 was more concise when asked to generate information on teachers' technology integration. For this study, the same prompts generated different outputs, and the prompts were reworked to retrieve useful information. This suggests that users need to become proficient in prompting to achieve the desired results. However, even after mastering optimal prompting techniques, changes in versions could require the reevaluation of these strategies. However, ChatGPT-4 was easier to prompt than ChatGPT-3.5.

Lastly, the greatest issue with creating course and lesson plans with ChatGPT is that AI lacks the ability to understand how to strategically connect information that has been previously used or will be used in course content. Although capable of organizing topics and subtopics, it cannot integrate the previous or upcoming course materials as a human educator might, leading to redundant explanations across multiple lessons, as if the information was being presented for the first time. Additionally, educators must recognize that ChatGPT's outputs are generalized information and may not always align perfectly with specific contexts. In other words, while ChatGPT can provide topical information on a subject, it may lack more detailed insights that integrate social, cultural, or context-specific elements relevant to the students and their learning environment. For instance, the information needed by Korean graduate students learning about AI and education might require a nuanced understanding due to the specificities of the Korean context. As an example, nearly every school in Korea has access to high-speed internet, which influences how AI and related tools are taught, differing from contexts like the United States where such infrastructure may not be as uniformly available in schools. Although the course materials generated by ChatGPT may not always make a coherent connection between past and future information, and despite its potential limitations in recognizing specific needs for certain student groups or contexts, ChatGPT can still be valuable in generating content ideas and providing basic information for lessons. Therefore, ChatGPT can be viewed as an extremely powerful search engine that is capable of aggregating information and presenting it in a centralized format. Nonetheless, the educator still plays a crucial role in making the information relevant and applicable to the specific student group and teaching context.

## 6. Limitations

This study has several limitations. First, the results may lack generalizability to different contexts and subject matters. Although both versions of ChatGPT are publicly available, it is possible that content created for different majors or information exploring other topics could produce varying results. Second, only three students were available for the graduate-level class. Ideally, more students would help interpret the results; however, Yin (2018) suggested that small participant numbers, or one participant, can yield impor-

tant information. Last, the study's participant sample consisted exclusively of graduate students; therefore, the findings may not be applicable to populations of different age groups. However, further research is needed to validate and extend the implications of these results.

## 7. Conclusions

Using ChatGPT and other AI tools connected to ChatGPT to design a course provided some evidence of both the affordances and limitations of this design strategy. AI offers significant time-saving benefits by generating preliminary outlines and structures, thereby reducing the workload for educators and instructional designers. Although some expertise may be required in the subject and some practice in prompting may be needed, the information generated can allow the creator to focus on other facets of the job. However, educators and designers must be aware of the disadvantages of AI limitations. A healthy skepticism toward the generated content is advisable; users should verify the information and recognize the potential need for additional content or refinement. As ChatGPT continues to advance, these limitations might be mitigated by stronger natural language processing models that benefit from greater tokenization and memory resources. This would, in turn, improve the quality of educational content creation.

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