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ÖĞRETMEN ADAYLARININ YAPAY ZEKÂ TEMELLİ METİN OLUŞTURUCU HAKKINDAKİ GÖRÜŞLERİ*

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Öz

Chatbotlar, insan-bilgisayar etkileşimi alanında son yıllarda önemli bir gelişme olarak öne çıkmaktadır. Doğal dil işleme ve makine öğrenimi teknolojileri kullanılarak tasarlanan bu yapay zekâ tabanlı programlar, kullanıcıların sorularını ve isteklerini anlayarak anında yanıt verebilmektedirler. Eğitimden müşteri hizmetlerine, sağlık hizmetlerinden satış ve pazarlamaya kadar çeşitli alanlarda kullanılan Chatbotlar; öğrenim yönetimi, kişiselleştirilmiş öğrenme, öğrenme desteği gibi eğitimde önemli olanaklar sunmaktadır. Ancak, bu teknolojinin kullanımında bazı sınırlılıklar da mevcuttur. Örneğin, gerçek insanlar gibi etkileşim kuramamaları, yanlış bilgi sunma riski, etik sorunlar ve kişiselleştirilmiş öğrenme deneyimi sunma konusunda yetersizlikler gibi. Bu nedenle, Chatbotların eğitimde etkili bir şekilde kullanılabilmesi için daha fazla araştırma ve geliştirme çalışması gerekmektedir. Bu araştırma kapsamında, öğretmen adaylarının Chatbotların eğitimde kullanımına yönelik görüşleri incelenmiştir. Bu doğrultuda 2022-2023 güz döneminde bir devlet üniversitesinde gerçekleştirilen araştırmanın katılımcı grubunu Öğretim Teknolojileri dersine katılan İngiliz Dili Eğitimi Anabilim Dalı'nda ve Matematik Eğitimi Anabilim Dalı'nda öğrenim gören 41 öğretmen adayı oluşturmaktadır. Araştırmada iki bölümden oluşan bir veri toplama aracı ile veriler toplanmıştır. Katılımcılar, Chatbotların zamandan tasarruf sağlama ve farklı bilgi sunma gibi avantajlarını görmüşlerdir. Ancak, beklenmeyen kaynaklardan yararlanma gibi olumsuzluklar da vurgulanmıştır. Genel olarak, öğretmen adaylarının çoğu Chatbotları dil ve içerik açısından başarılı bulmuşlardır. Öğretmen adayları, Chatbotların gelecekte eğitimde yaygın olarak kullanılacağını ve öğrencilerini bu teknolojiye yönlendireceklerini belirtmişlerdir. Sonuç olarak, Chatbotların eğitimde etkili bir şekilde kullanılabilmesi için öğrenci ihtiyaçlarına uygun olarak tasarlanmaları, doğru ve güncel bilgiler sunmaları, kişiselleştirilmiş öğrenme deneyimleri sunmaları ve eğitim uzmanları tarafından desteklenmeleri gerekmektedir. Bu şekilde, Chatbotlar eğitimde daha etkili bir araç haline gelebilirler.

Anahtar Kelimeler: yapay zekâ; içerik üretme; chatgpt; chatbot; eğitimde yapay zekâ

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PRE-SERVICE TEACHERS' VIEWS ON AN ARTIFICIAL INTELLIGENCE BASED TEXT GENERATOR

Abstract

Chatbots have emerged as an important development in the field of human-computer interaction in recent years. Designed using natural language processing and machine learning technologies, these artificial intelligence-based programs can understand users' questions and requests and respond instantly. Chatbots, which are used in various fields ranging from education to customer service and healthcare to sales and marketing, offer important opportunities in education such as learning management, personalized learning, learning support. However, there are a number of limitations in the use of this technology. For example, an inability to interact as real people would, the risk of providing false information, ethical issues, and an inability to provide a personalized learning experience. Therefore, more research and development studies are needed for the effective use of chatbots in education. Within the scope of this study, pre-service teachers' views on the use of chatbots in education were examined. In this direction, the participant group of the research, which was conducted at a state university in the fall semester of 2022-2023, consisted of 41 pre-service teachers studying in the Department of English Language Teaching and the Mathematics Education who attended the Instructional Technologies course. In the study, data were collected with a data collection tool consisting of two parts. The participants saw the advantages of chatbots, such as timesaving and providing different information. However, negativities such as utilizing unexpected sources were also emphasized. In general, most of the pre-service teachers found chatbots successful in terms of language and content. The pre-service teachers stated that chatbots will be widely used in education in the future and that they will direct their students to this technology. In conclusion, for chatbots to be used effectively in education, they need to be designed in accordance with student needs, provide accurate and up-to-date information, offer personalized learning experiences, and be supported by educational experts. In this way, chatbots can become a more effective tool in education.

Keywords: artificial intelligence; content generation; chatgpt; chatbot; artificial intelligence in education.

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Geniş Özet

Yapay zeka (YZ), son yılların güncel teknoloji konuları arasında önemli bir yere sahiptir. YZ, amacı insan zihninin nasıl çalıştığını ve aynı ilkelerin teknoloji tasarımında nasıl uygulanacağını anlamak olan disiplinler arası bir bilgi ve araştırma alanıdır (Dodigovic, 2007). Kullanıcılar için verilerden çıkarımlar yaparak insan davranış ve diyaloglarını modelleyebilen yapay zeka temelli birçok araç bulunmaktadır. Chatbotlar bu araçlardan biri olarak karşımıza çıkmaktadır. Yapay zekanın kullanılmasından önce de var olan Chatbotlar, kullanıcılarla etkileşim kurabilen ve kullanıcı girdilerini doğal dili kullanarak işleyebilen yazılım programı olarak tanımlanmaktadır. Chatbotlar ses ve metin tabanlı olabilir. Böylece kullanıcılar Chatbotlar ile konuşarak ya da yazışarak iletişim kurabilir. Aynı zamanda chatbotlarda, yapay zeka (AI) entegrasyonu kullanılabilir. Yapay zeka tabanlı Chatbotların en bilinen örneklerinden biri olan ChatGPT, OpenAI tarafından ilk kez 30 Kasım 2022'de genel kullanıma sunulmuştur. ChatGPT'nin doğal dil sorgularını anlama ve insan benzeri yanıtlar üretme yeteneği, onu çok çeşitli sorulara hızlı yanıtlar almak için popüler bir araç haline getirmiştir (Adıgüzel vd., 2023). Chatbotların eğitim alanında kullanımına ilişkin çalışmaların sayısı, bu alanda yapılan çalışmaların çokluğu nedeniyle hızla artmaktadır. ChatGPT'nin eğitimdeki etkilerinin daha iyi anlaşılması için, eğitimde ChatGPT kullanımına odaklanan daha fazla araştırma yapılması gerektiği belirtilmektedir (Wu ve Yu, 2023).

Öğretmen adaylarının yapay zekâ temelli metin oluşturucu hakkındaki görüşlerinin incelenmesinin amaçlandığı bu çalışmada nitel araştırma yöntemi işe koşulmuştur. Araştırmanın katılımcıları, olasılıklı olmayan amaçlı örnekleme yöntemi ile belirlenmiştir. 2022-2023 eğitim öğretim yılı güz döneminde bir devlet üniversitesinde gerçekleştirilen araştırmanın katılımcılarını Öğretim Teknolojileri dersini alan İngiliz Dili Eğitimi Anabilim Dalı'nda ve Matematik Eğitimi Anabilim Dalı'nda öğrenim gören 41 öğretmen adayı oluşturmaktadır. Katılımcıların 15'i erkek; 26'sı kadındır. Katılımcıların 27'si İngiliz Dili Eğitimi Anabilim Dalı'nda; 14'ü Matematik Eğitimi Anabilim Dalı'nda öğrenim görmektedir. Araştırmada iki bölümden oluşan bir veri toplama aracı ile veriler toplanmıştır. Veri toplama aracının ilk bölümünde demografik bilgilere ve katılımcıların daha önce chatbot kullanma durumlarına ilişkin üç soru bulunmaktadır. İkinci bölümde, yapay zeka kullanılarak geliştirilen içeriğe, chatbotların öğrencilere etkisine, meslek yaşamlarında chatbot kullanımını tercih etme/etmeme durumlarına ve chatbotların geleceğine ilişkin sorular bulunmaktadır. Veri toplama aracı araştırmacı tarafından geliştirilmiş ve öğretim teknolojileri alanında iki uzmandan görüş alınarak düzenlenmiştir. Veri toplama aracının ilk bölümü dijital ortama aktarılmış ve veriler bir form aracılığıyla toplanmıştır. Veri toplama aracının ikinci bölümünün verileri ise, katılımcılarla yapılan birebir görüşmelerden elde edilmiştir.

Araştırmanın ilk haftasında Öğretim Teknolojileri dersini alan öğretmen adaylarına chatbotlardan ChatGPT'nin tanıtımı yapılmıştır. Öğretim Teknolojileri dersi haftada iki saat yapılan ve öğretmen adaylarını öğretimde kullanabilecekleri yeni teknolojilerle tanıştırarak kullanım örnekleri sağlayan zorunlu bir derstir. Tanıtımın ardından öğretmen adaylarından ChatGPT'yi kullanmaları istenmiştir. Ardından etkileşimli materyaller hazırlanabilen Genial.ly ortamında eğitim materyalinin nasıl oluşturulabileceğine ilişkin bilgiler verilmiştir. ChatGPT ve Genial.ly öğretmen adaylarına tanıtıldıktan sonra hazırlayacakları ödev hakkında bilgi verilmiştir. Ödev olarak öğretmen adaylarından alanlarıyla ilişkili ve ortaokul düzeyinde eğitim materyalleri hazırlamaları istenmiştir. Hazırlayacakları ödevlerin konularını kendilerinin belirleyebilecekleri, içeriği ChatGPT aracılığıyla hazırladıktan sonra Genial.ly'de materyale dönüştürebilecekleri açıklanmıştır. Hazırlanan ödevlerin ders kapsamında öğrenme yönetim

sistemi olarak kullanılan Microsoft Teams'e yüklenmesi ve diğer öğretmen adaylarıyla paylaşılması istenmiştir. Ödevlerin tesliminin ardından gönüllü öğretmen adayları ile araştırmacının ofisinde birebir ve yüz yüze yarı yapılandırılmış görüşmeler yapılmıştır.

Yarı yapılandırılmış görüşmelerden elde edilen veriler içerik analizi yöntemiyle analiz edilmiştir. Araştırmaya katılan öğretmen adaylarının 18'i yapay zekâ temelli içerik üretim ortamlarını ders öncesinde kullandığını, 23'ü ise kullanmadığını belirtmiştir. Öğretmen adayları, yapay zekâ temelli içerik geliştirme ortamı deneyimlerini zamandan tasarruf sağladığı, bilgiye erişimi kolaylaştırdığı, tek kaynak kullanarak birçok bilgiye ulaşılabildiği, doğru soruyu sormanın önemli olduğu, erişilen bilgilerin uyarlanarak kullanılması gerektiği şeklinde belirtmektedir. Yapay zeka tabanlı içerik geliştirme ortamlarında üretilen içeriğin dil, içerik kapsamı ve kullanılabilirlik bağlamında değerlendirilmesi sonucuna göre öğretmen adaylarının birçoğunun belirtilen özellikler bağlamında bu ortamı başarı bulduğu söylenebilir. Öğretmen adayları, yapay zeka tabanlı içerik geliştirme ortamlarının öğrenciler üzerinde bilgi üretme becerisi gibi bir etkisinin olabileceğini belirtmiştir. Farklı sorgular üretmenin ve bu sorgularla edinilen bilgilerin düşünme becerilerini güçlendirebileceği belirtilmiştir. Gelecek meslek yaşamlarında ChatGPT'yi öğrencilerine kullandırmayı teşvik eden öğretmen adayları olduğu kadar, öğrencileri tembelliğe itebileceği endişesiyle bu ortamların kullanımını düşünmeyenler de bulunmaktadır. Mesleki gelişim bağlamında da bu ortamları kullanabileceğini belirten öğretmen adayları bulunmaktadır. Yapay zeka temelli içerik geliştirme ortamlarının gelecekteki yerine ilişkin öğretmen adaylarının görüşleri incelendiğinde öğretmen adayları, bu ortamların hayatın hemen hemen her alanında olacağını belirtmektedir. Bu alanlara eğitim-öğretim, ar-ge çalışmaları, arama motoru, iş dünyası örnek olarak verilebilir.

Bu araştırmada öğretmen adaylarının yapay zeka temelli metin oluşturucularından biri olan ChatGPT'nin kullanımına ilişkin görüşleri alınmıştır. Araştırma 2022-2023 öğretim yılında bir devlet üniversitesinde öğretmen adayları ile gerçekleştirilmiş ve veriler tek seferde toplanmıştır. Gelecek araştırmalar uzun süreçlere yayılarak boylamsal türde gerçekleştirilebilir. Bu araştırmada nitel veri toplama tekniklerinden görüşme kullanılmıştır. Farklı türde veri toplama araçlarının kullanılması çalışmayı güçlendirecektir. Bu bağlamda gelecek çalışmalarda nitel ve nicel veri toplama teknikleri bir arada kullanılabilir. Öğretmen adaylarının görüşleri doğrultusunda yapay zekanın öğretimde kullanımına yönelik daha kapsamlı ve çok değişkenli çalışmalar yapılabilir.

Introduction

Artificial intelligence (AI) is an umbrella term that describes a set of technologies and methods such as machine learning, natural language processing, data mining, neural networks or an algorithm (Zawacki-Richter et al., 2019). AI is an interdisciplinary field of knowledge and research with the aim of understanding how the human mind works and how to apply the same principles in technology design (Dodigovic, 2007).

Computers performing cognitive tasks are often associated with the human mind, particularly learning and problem solving (Baker et al., 2019). In this context, it is predicted that artificial intelligence will be programmed to do the work that humans do by imitating humans. As in many areas of life, artificial intelligence also finds its place in the field of education and training. It has been stated that artificial intelligence applications may be the most important educational technology topic in the next twenty years (Zawacki-Richter et al.,

2019). A 2019 report states that artificial intelligence is on the verge of transforming schools at all levels (Baker et al., 2019).

A chatbot is a software program that can interact with users and process user input using natural language (Huang et al., 2022). Chatbots can use text or voice interfaces to interact with people. They simulate a dialog with a human and can be integrated into software such as online platforms and digital assistants (Wollny et al., 2021). Text-based chatbots chat and interact with users through natural written language (Rapp et al., 2021). ChatGPT is an example of text based chatbots. There are also voice based chatbots. Apple's SIRI, Google Assistant and Amazon Lex (Wu & Yu, 2023), which work online, are widely used voice-based chatbots. At the same time, artificial intelligence (AI) integration can be used in chatbots. In summary, chatbots are AI-powered tools that combine natural language processing or other technologies and can interact with a human at a certain level through text or voice (Perez et al., 2020). Tools such as Google Dialogflow and IBM Watson enable the design of AI-based chatbots. Therefore, users who do not know programming can also design AI chatbots.

Chatbots in Education

Chatbots should be able to understand the content of the dialog and identify the social and emotional needs of users during the conversation (Adıgüzel et al., 2023). Artificial intelligence-based chatbots can be broadly categorized into three types; machine learning-based, natural language processing-based and hybrid chatbots. Machine learning-based chatbots learn the user's intent and provide the necessary information to the user through filtering. To do this, they need to be trained with large amounts of data. Natural language processing-based chatbots detect language based on the user's input, make inferences and use more advanced machine learning algorithms. Hybrid chatbots use a combination of artificial intelligence-based technologies and rule-based chatbots (Wu & Yu, 2023).

Designed on a web platform to teach certain areas such as computer science, language, education, engineering, and mathematics (Kuhail et al., 2023), chatbots have long been used in education (Perez et al., 2020). In education, chatbots are often used for skill development, improving educational effectiveness and student motivation (Wollny et al., 2021). The advantages of chatbots in learning for schools and universities where vocational training, such as repetitive practice, is provided are well known. In addition to addressing frequently asked questions (FAQs), there are also chatbots with the main purpose of serving as educational aids to ease the workload of teachers in their subjects (Perez et al., 2020). Although most of the chatbots used in education work on desktop platforms, mobile-based chatbots are becoming widespread (Kuhail et al., 2023). It is stated that the impact of artificial intelligence chatbots is greater in higher education compared to primary and secondary education (Wu & Yu, 2023). Thanks to the widespread use of online learning and computer-assisted learning in higher education, the use of chatbots has also increased (Huang et al., 2022).

Chatbots are used in teaching and learning, research and development, assessment, management and consultancy (Okonkwo & Ade-Ibijola, 2021). The uses of chatbots in education are examined under three main headings; learning, assisting and mentoring (Wollny et al., 2021). In another study, chatbots in education are classified in two dimensions; service-oriented and teaching-oriented chatbots (Perez et al., 2020). Service-oriented chatbots are used in the administration and registration processes such as answering frequently asked questions and providing support to students during registration periods. Instructional chatbots are divided into formal and informal instructional chatbots and are used directly in

the teaching process. Grudin and Jacques (2019) classify chatbots into three types; (1) virtual friends, (2) intelligent assistants, and (3) task-oriented bots. It is stated that the majority of the chatbots examined in the literature are task oriented. (Rapp et al., 2021). Task oriented or rule based chatbots are programmed to help users solve specific problems or to complete tasks.

Chatbots have different effects in the context of students and teachers. Since communication and many other activities take place predominantly in online environments, chatbots are often used to improve student interaction (Okonkwo & Ade-Ibijola, 2021). Chatbot interaction is achieved through the application of text, speech, graphics, haptic gestures, gestures, and other modes of communication to assist students in the learning process (Kuhail et al., 2023). Chatbots can help reduce transactional distance (Moore, 1993) by providing a dialogue for the student to interact with the course content. Educators can use a chatbot to provide a knowledgeable friend that students can access (for example, student-student interaction), a virtual teacher who provides guidance and advice (for example, student-teacher interaction), and language learning content in a simulated language learning scenario (for example, student-content interaction) (Huang et al., 2022). In the process of interacting with learners, chatbots assume various roles such as teaching aids, peer aids, teachable aids, and motivational aids (Kuhail et al., 2023). In addition, certain chatbots can detect the student's mood and encourage emotionality through their reactions (Perez et al., 2020). AI chatbots can help students integrate new knowledge with old knowledge through deep discussions and productive interactions (Lee et al., 2022). Also AI chatbots can have a major impact on learning outcomes in terms of performance and motivation (Wu & Yu, 2023). The clearest examples of support in learning are provided by chatbots with the role of assisting the teacher or reinforcing repetitive tasks (Perez et al., 2020). Chatbots have been shown to promote students' social presence through interpersonal, open and cohesive communication (Huang et al., 2022). It has been found that using chatbots as a pedagogical tool can help students with disabilities to progress in their studies. It can also help them bridge the educational ‘gap’ that certain social and minority groups may experience (Perez et al., 2020).

ChatGPT's ability to understand natural language queries and to generate human-like responses has made it a popular tool for getting quick answers to a wide range of questions (Adıgüzel et al., 2023). ChatGPT communicates with users through chat, answering questions, accepting errors, and challenging false propositions (OpenAI, 2024a). There are a number of limitations of using ChatGPT in education (Tlili et al., 2023). First of all, it is stated that the answers given by ChatGPT are not always correct (Lo, 2023) and that ChatGPT answers may differ depending on the way the questions are asked, even if the topic of the conversation is the same. In addition, it seems possible that the interest in ChatGPT in education may decrease. Since a ChatGPT lacks emotion and reflective thought, it may weaken users' interest in it in education. Research emphasizes that emojis, active listening skills, timeliness and relevance of the chatbot's responses can be key elements to increase engagement (Rapp et al., 2021). A number of the dimensions that should be evaluated in artificial intelligence in education are the involvement of children in the process, the possibility of discrimination, and the long-term nature of education (Baker et al., 2019). During chat, chatbots may fail to understand the user's purpose or to give irrelevant responses (Okulu & Muslu, 2024; Rapp et al., 2021). In addition, the use of artificial intelligence in education raises various ethical issues. For example, in order to utilize AI in learning analytics, large amounts of data, including the personal data of universities and students, need to be transferred to these systems (Zawacki-

Richter et al., 2019). The application of chatbot technology in education brings a few ethical challenges. Student plagiarism is emphasized as an important problem (Lo, 2023). There are privacy questions about where the collected data is stored and what happens to it (Hojeij et al.; Okonkwo & Ade-Ibijola, 2021). For example, a chatbot designed to collect health data can utilize its human-like qualities to obtain information that the user would not otherwise disclose to a machine (Rapp et al., 2021). When the limitations are examined, it is stated that chatbots used in education can discriminate in the context of gender, minorities and cultural differences (Tlili et al., 2023). Challenges and limitations include insufficient or unfavorable data set training and a lack of confidence in usability methods, as well as a lack of feedback (Kuhail et al., 2023).

Okulu and Muslu (2024) examined the use of ChatGPT in designing a course to be given to pre-service teachers. As a result of the research, the advantages of ChatGPT in developing a feasible lesson plan and its limitations in terms of communication and misunderstanding were emphasized. Hojeij et al. (2024) investigated teachers' perspectives on the use of ChatGPT in schools. As a result of the research, the importance of its potential to individualize learning and make it student-centered was emphasized. In addition to concerns about access to ethical and reliable content, the need for professional development to utilize ChatGPT was also mentioned. In another study, ChatGPT was reported to be a valuable tool used by pre-service teachers to develop lesson plans (Pişkin Tunç, 2024). It is stated that pre-service teachers have a moderately positive view of the benefits of ChatGPT and are aware of its strengths and opportunities (Markos et al., 2024).

The number of studies on the use of chatbots in education is increasing rapidly due to the abundance of studies in this field. This shows that chatbot technology has seen a comprehensive integration in the field of education (Okonkwo & Ade-Ibijola, 2021). It is stated that most of the studies examined in the field of chatbots were conducted after 2017 (Rapp et al., 2021). It is further stated that developments regarding the use of chatbots in education have only now started to gain momentum and that there is still much to be done (Wollny et al., 2021). For a better understanding of the effects of ChatGPT in education, more research focusing on the use of ChatGPT in education is needed (Wu & Yu, 2023). It is emphasized that feedback from artificial intelligence chatbots can be more effective than online feedback written by humans in increasing pre-service teachers' interest in learning (Fidan & Gencel, 2022). It is also stated that quantitative methods are used in most of the studies on the use of artificial intelligence in education, while qualitative methods are in the minority. (Zawacki-Richter et al., 2019). Although the most common research methods used in human-chatbot interaction research are quantitative, the scarcity of studies using qualitative methods draws attention (Rapp et al., 2021). In this study, the aim is to determine the views of pre-service teachers on artificial intelligence-based chatbots, and the qualitative research method was employed.

This study, with the general aim of determining the views of teacher candidates towards chatbots, sought answers to the following research questions:

RQ 1. What are the chatbot experiences of teacher candidates regarding chatbots?

RQ 2. What are the opinions of teacher candidates on the language, scope, and usability of chatbot content?

RQ 3. What are the opinions of teacher candidates about what chatbots can offer to students?

RQ 4. What are the opinions of pre-service teachers about using chatbots when they become teachers?

RQ 5. What are the opinions of teacher candidates about the future role of chatbots?

Method

The Research Group

In the study conducted based on qualitative research methods, the participants were selected using a non-probability purposive sampling method. Data were collected from teacher candidates taking the Instructional Technologies course in a single event. The study, which was conducted at a state university in the fall semester of 2022-2023, included forty-one teacher candidates who were enrolled in the English Language Education Department and the Mathematics Education Department and who were taking the Instructional Technologies course in the second year. Of the participants, fifteen were male, while twenty-six were female. Among them, twenty-seven were enrolled in the English Language Education Department, and fourteen were enrolled in the Mathematics Education Department.

Data Collection Tool

In the study, data were collected using a data collection tool consisting of two sections. The first section of the data collection tool contains three questions aimed at gathering demographic information including gender, department and the experiences regarding chatbots from the teacher candidates. In the second section, there are eight questions about the content generated in chatbots, the impact of chatbots on students, the use of chatbots when they become teachers, and the future role of chatbots. The data collection tool was developed by the researcher and reviewed by two experts in the field of instructional technology for the validity and reliability of the questions. Based on expert opinions, the final version of the data collection tool was prepared. The finalized data collection tool was then transferred to a digital format.

Data Collection Process

Within the scope of the study, the data collection process commenced with the ethical approval obtained from a state university on January 2, 2023, under the approval number 77287. The study started in the 10th week of the spring semester of the 2022-2023 academic year. The Instructional Technologies course, which is two hours a week, aims to support/enrich pre-service teachers' teaching processes with technology. For this purpose, in addition to the theoretical content, pre-service teachers are given the basic introduction and use of technological tools. The course is held in the computer laboratory of the faculty. Thus, students can practice with the technological tools explained. In the first week of the research, teacher candidates enrolled in the Instructional Technologies course were introduced to ChatGPT, a chatbot platform. The students were encouraged to use this platform. After the introduction and use of the ChatGPT environment, information was provided on how to create educational materials in the Genial.ly. Following the introduction of both platforms to the teacher candidates, they were briefed on the assignment they needed to prepare. Within the scope of the assignment, they were asked to develop interactive educational materials specific to their own fields at the middle school level in Genial.ly.

Also, the teacher candidates were instructed to consider the following criteria for the educational material they were to develop:

- The content of the educational material should be related to the field in which the teacher candidates are receiving education.
- The content of the assigned topic should be created using the Chatbot, ChatGPT.
- Content generated in the ChatGPT should not be simply copied and pasted into the educational material.
- The prepared educational material should be shared by way of Microsoft Teams.
- Screenshots of the content produced in the ChatGPT should be shared by way of Microsoft Teams.

Teacher candidates completed the process of developing educational materials within a one-week period as part of the Instructional Technologies course. Screenshots of some of the assignments prepared by pre-service teachers are given below (Figure 1 and Figure 2).

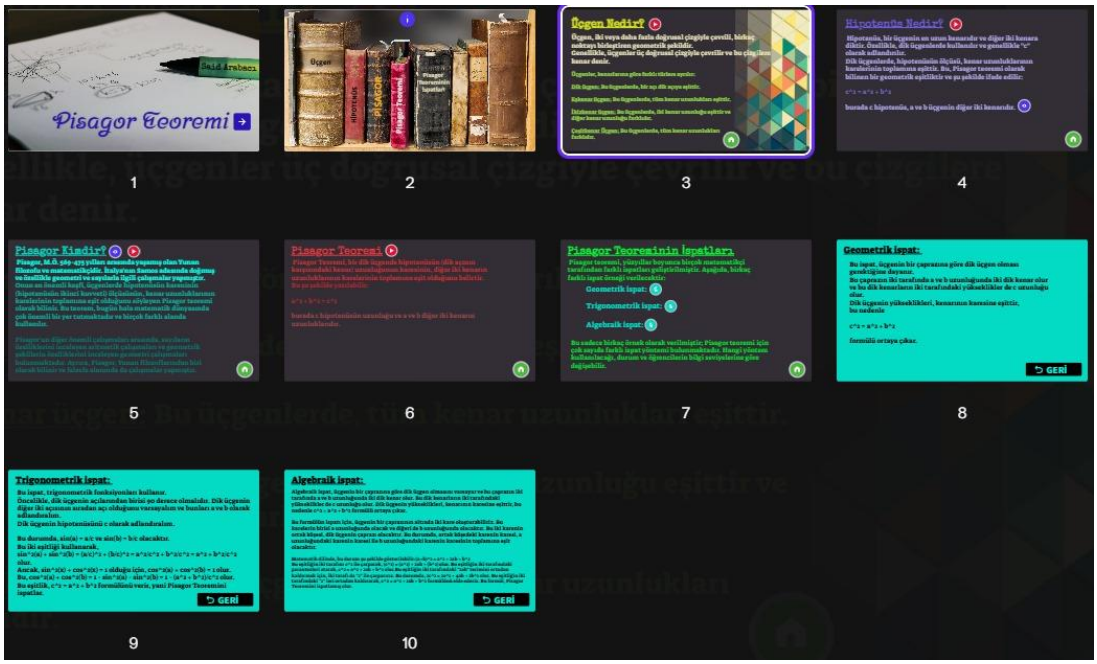

Figure 1. Sample Screenshots of Assignments Prepared by Mathematics Education Students

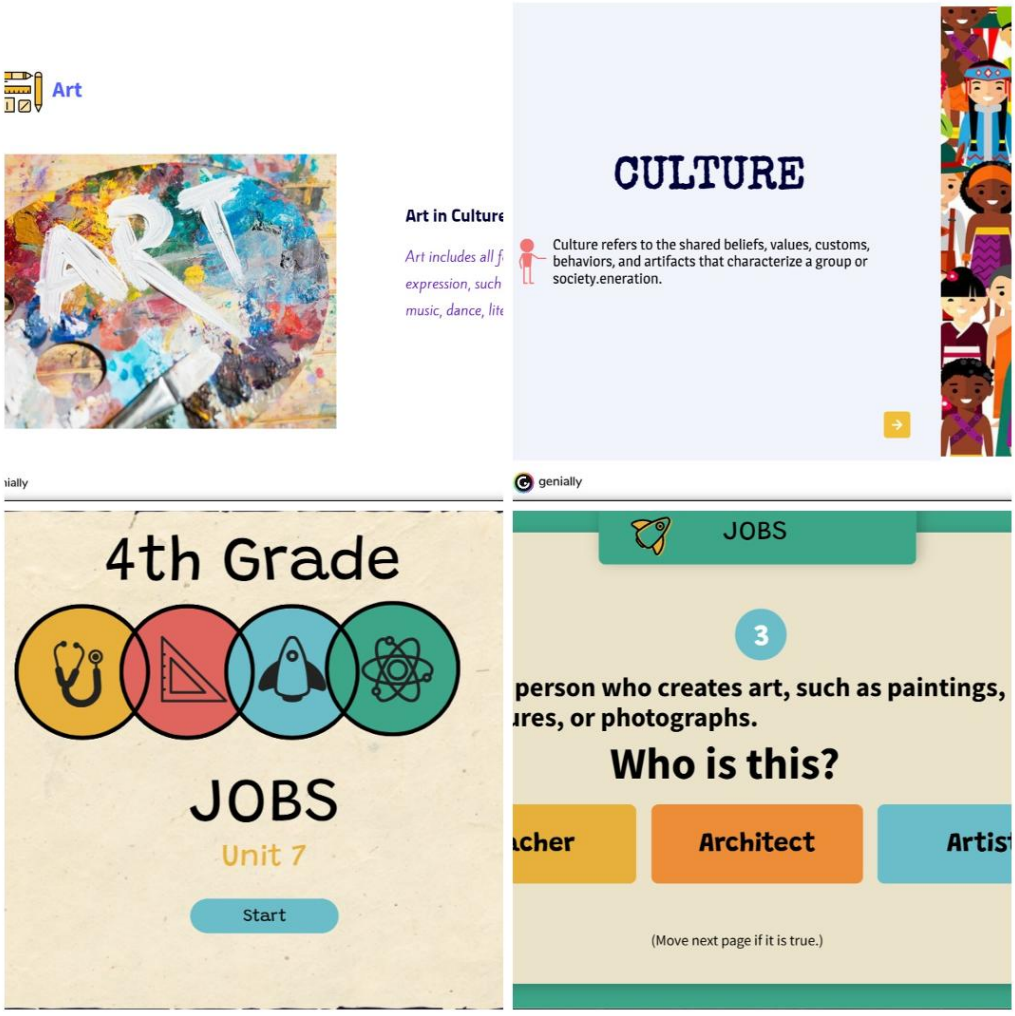

Figure 2. Sample Screenshots of Assignments Prepared by English Language Education Students

In the second week of the research, semi-structured interviews were conducted with pre-service teachers using the data collection tool developed by the researcher. The interviews were conducted face-to-face and individually in the researcher's office.

Data Analysis

The study results were obtained through the content analysis of responses to semi-structured interview questions. The collected data were initially segmented into codes, and codes with similar expressions were grouped under common overarching themes. After the development of codes and themes, main themes were created in line with the objectives outlined by the research questions, and the data were grouped accordingly. To enhance the reliability of the research and to maintain high internal consistency, the coding process involved having another expert also code the data to protect against the individual influence of the researcher. To strengthen the reliability of the codes determined by both researchers, the agreement formula proposed by Miles and Huberman (1994) was used (Reliability Formula: Agreement/Agreement + Disagreement *100). The agreement percentage obtained through this formula was above 85% for all the questions. High internal consistency in the research is directly proportional to the high agreement among coders (Baltacı, 2017).

Results

The results in this study, which examines the views of teacher candidates on chatbots, have been presented in parallel with the research questions. Among the teacher candidates who participated in the study, eighteen had used chatbots before the course, while twenty-three had not. In terms of gender, out of those who used these chatbots, ten were male, and eight were female, whereas out of those who did not use these chatbots, five were male, and eighteen were female.

The experiences of the teacher candidates in relation to chatbots

Participants were asked how they evaluated their ChatGPT experience, and the responses were analyzed. A structure similar to that presented in Table 1 emerges.

Table 1. The experiences of teacher candidates regarding chatbots

Code	Theme	Quotations
Positive (n=33)	Timesaving (n=4)	"It allows us to find answers to questions quickly." "Many questions are answered instantly."
	Access to information (n=9)	"It can provide me with the necessary information." "Since the obtained information is comprehensive, it allows us to obtain the desired information." "It leads us directly to the information."
Negative (n=5)	Minimizing resource utilization (n=1)	"When looking at accounts that obtain information from different applications, more information is acquired."
	Finding the right question (n=2)	"To obtain exactly what we want, we need to ask the right and very detailed questions." "Once we know how to ask the right question, it's an environment that provides excellent answers."
	Accessed information (n=1)	"Not all of the accessed information and ideas can be adapted to the lesson."

It is possible to categorize the experiences of teacher candidates in both positive and negative codes regarding chatbots. Before the study, it was expected that themes falling into the positive category would emerge. The most prominent feature of these environments is that they save time and the accessed information is structured differently from search engines. However, the theme of "Minimizing resource utilization", found in the negative code, is an unexpected finding. This is because chatbots retrieve information from various sources. Considering the context of ChatGPT, it is worth noting that the research was conducted without searching for data beyond 2021. Therefore, the identified theme of "Minimizing resource utilization" can also be evaluated in the context of accessing current information. It is believed that as new versions of such environments are developed, this issue will be resolved. Finding the right question is an important limitation. This is a valid concern for search engines as well. Without selecting the correct keywords, it is impossible to access accurate information, regardless of the search environment. The participants noted that not all of the accessed information can be adapted to the lesson. The necessity of not using the accessed information verbatim was emphasized when utilizing the content.

The teacher candidates' opinions on the content generated in chatbots as part of their assignments were assessed

Participants were asked about their opinions on the language, scope and usability of the content they accessed as part of the learning material development assignment. When

assessing the content in terms of language, it was determined that twenty-seven teacher candidates found this environment successful, twelve found it very successful, while two individuals stated that this environment was not successful. As a result of the evaluation of the content in terms of language, 95% of the teacher candidates considered this environment successful in terms of language. Regarding the opinions concerning the scope of the generated content, twenty-seven teacher candidates found it successful, twelve found it very successful, and one found it successful while one other found it not successful. In terms of the content scope, 95% of those surveyed considered it successful. When examining the usability of the generated content for assignments, twenty-five teacher candidates found it successful, twelve found it extremely successful, while three teacher candidates found it to be unsuccessful, and one teacher candidate found it not at all successful. Regarding the usability of the generated content, 90% of the teacher candidates found it usable. The teacher candidates had positive views on the research they conducted on artificial intelligence-based content development environments for their assignments. The target audience, which is currently undergoing undergraduate education and is referred to as the teacher candidates, is also considered as students. When thinking about both them and the students they will have as teachers, the impact of chatbots on students is an important question.

The impact of chatbots on students

The responses of the participants who were asked how AI-based environments such as ChatGPT could affect students were analyzed. The codes and themes that emerged from the responses to the question are as seen in Table 2.

Table 2. The impact of chatbots on students

Code	Theme	Quotations
Information (n=26)	Access (n=9)	"Grants the ability to instantly access a wealth of information." "Enables easy access to information." "Boosts student motivation and facilitates easy access to knowledge."
	Research (n=6)	"Expands the options; increases research knowledge." "Provides more comprehensive information." "Simplifies the research process."
	Producing (n=7)	"Provides different thinking methods." "Encourages practical thinking." "Produces solutions when facing challenges." "Offers assistance in idea generation and implementation."
Technology skills (n=4)		"Facilitates more lasting learning and teaching through technology." "Allows for a closer relationship with technology." "Imparts skills like effective use of technology."

The responses given by the teacher candidates regarding the impact of chatbots on students converge under the codes of information and technology skills. The formation of codes or themes related to access to information and researched information is an expected outcome by the researcher. However, the code or theme of producing information and developing technology skills is an unexpected and unconsidered situation. Through chatbots, students will have quick and easy access to information. In addition to this, it can be ensured that the researched information is detailed. Furthermore, it has been mentioned by teacher candidates that there may be an effect of enabling students to produce knowledge. When the responses are examined, it is considered that students can improve their thinking skills by asking questions regarding chatbots and blending different pieces of information. It is also

stated by the teacher candidates that such environments, which are products of technology, can contribute to improving students' technology skills. Will teacher candidates prefer and use environments with such an impact on students when they become teachers? What are the factors causing this?

The situation of teacher candidates using chatbots when they become teachers is examined

Participants were asked how they would use ChatGPT when they become teachers. The teacher candidates have evaluated their use of chatbots in the contexts of students, courses, and professional development when they become teachers (Table 3).

Table 3. The situation of teacher candidates using chatbots when they become teachers is examined

Code	Theme	Quotations
Student (n=28)	Recommend (n=26)	"I would like to guide students and encourage them to use it." "I would motivate my students to use it." "I would tell them that it's a great and comprehensive tool for researching anything they want."
	Not to recommend (n=2)	"I would prefer to use it myself to avoid spoiling the students." "Actually, no, I wouldn't recommend it to them because they already have easy access to information, and relying on it might make them lazy."
	Content Development (n=3)	"I would use it for text preparation and idea generation in terms of teaching." "I might use it as a topic or activity idea for creating content. "It can be used for support in content creation."
Course (n=13)	Material (n=3)	"I would prepare teaching materials on ChatGBT and then conduct my lessons." "I'm confident that I will receive support when planning my lessons and designing activities and materials."
	Activity (n=7)	"For creating activities in lesson topics." "I ask questions about how to conduct teaching and get answers." "I get activity ideas."
Professional Development (n=12)		"I would primarily use it for my professional development." "It can be used for professional development purposes, and students can benefit from it as well."

There are teacher candidates who intend to encourage students to use these environments and those who do not, as they believe it may lead students to laziness due to the possibilities offered by these environments. The teacher candidates mostly plan to use these environments for educational purposes when they become teachers. They mention that they will use them for creating course content, developing materials, or planning activities. In all three contexts, there is a common theme mentioned by teacher candidates; "I get ideas." The teacher candidates are aware that they will not be able to develop course content, materials, or activities solely based on the information obtained from these environments. The teacher candidates also mention that they can use these environments for professional development. The themes mentioned in the previous code also serve professional development. The teacher candidates who will seek ideas for developing content, materials, or activities for educational purposes will also benefit from them in terms of professional

development. These evolving environments are likely to continue to be used in the future. In this context, where do such environments stand in the future?

The Future Role of Chatbots

Participants were asked their views on where artificial intelligence-based environments such as ChatGPT could take place in the world of the future. Teacher candidates believe these platforms will have a presence in almost every aspect of life. These areas include:

- Education and teaching
- Research and development projects
- Search engines
- The business world

The teacher candidates have expressed that chatbots can be utilized in various fields, with statements such as “from computers to healthcare in every field,” and “I see them as the future of the world,” and “I believe they can be used in every field and discipline.” In addition, unemployment was identified as another significant aspect. Chatbots can also write basic-level code. Considering the improved versions of these environments, it can be said that there may be a reduced need for workforce in fields such as software development.

Discussion and Conclusion

In this study, semi-structured interviews were conducted to determine the views of pre-service teachers on artificial intelligence-based content producers. The semi-structured interviews were analyzed by the content analysis technique. The experiences of pre-service teachers in AI-based content development environments were classified into positive and negative themes. The most important advantage of AI-based content production tools is that it saves time, and the information obtained is different from search engines. However, as a negative point, the theme of utilizing limited resources is unexpected. Similarly, in one study, it is stated that the content queried concerning chatbots is incomplete, inaccurate or outdated (Janssen et al., 2021; Tlili et al., 2023). However, AI-supported content development platforms provide information from various sources. When considered in the context of ChatGPT, there was information that the data after 2021 was not scanned at the time of the research. Therefore, the theme of utilizing limited resources is also important in terms of accessing up-to-date information. As new versions of such platforms are released, it is thought that this problem will be solved. It is stated that the information stored in the bot should be updated regularly in order for the chatbot to provide up-to-date and accurate information on every subject (Okonkwo & Ade-Ibijola, 2021).

Finding the right question is an important limitation. This is also true for search engines. Unless the correct keywords are chosen, it may not be possible to reach the right information in any search environment (Ruthven & Lalmas, 2003). It is emphasized in the literature that prompt engineering skills are necessary for the use of productive artificial intelligence-based environments (Knoth et al., 2024). The research participants stated that not all of the information accessed can be adapted to lessons. The information accessed through chatbots should be interpreted by synthesizing it with different sources. Unemployment was also identified as another important negative feature. Although it is not interpreted as unemployment, it is stated that artificial intelligence can significantly reduce the workload of teachers (Perez et al., 2020; Zawacki-Richter, Marin, Bond & Gouverneur; 2019). Basic level

codes can also be written with AI-based content development environments. Considering the improved versions of these environments, it can be said that the need for a labor force in areas such as software may decrease. Whether artificial intelligence will bring unemployment or not is an issue that is frequently discussed in the literature (Ford, 2013; Korinek & Stiglitz, 2008; Mutascu, 2021). However, it is stated that individuals with high digital literacy who can effectively use artificial intelligence support in their current jobs will not be negatively affected (Georgieff & Hyee, 2022). It is emphasized that combining human knowledge and experience with AI tools such as ChatGPT has great potential (Okulu & Muslu, 2024). In other words, AI gains value when it is supported by human expertise. In addition, it is stated that designing dialogs in chatbots is challenging even for software developers. For example, when the student's input is incorrect, they may give meaningless answers. Therefore, it is necessary to train the chatbots well in order to get effective and accurate results (Huang et al., 2022).

As part of their assignments, pre-service teachers produced content in artificial intelligence-based content development environments. They were asked to evaluate the content produced in terms of language, scope and usability. According to the results of the evaluation of the content produced in terms of language, it can be said that most of the pre-service teachers found this environment successful in terms of language. However, it can be said that the language used in a chatbot environment is closely related to the language preferred by the user. For example, it is stated that people may use poor language in their written dialogues with chatbots, consisting of spelling and grammatical errors, obscene words and sentences full of ambiguities, all of which may weaken the performance of the chatbot (Rapp et al., 2021). This will also affect the language used by the chatbot. Therefore, the language of the chatbot is shaped according to the language of the user. Many pre-service teachers found the scope of the content produced successful. The usability of the generated content for the assignment was also found to be successful by most of the pre-service teachers. Regarding the usability of the content, most of the pre-service teachers found the content usable. The opinions of pre-service teachers about the artificial intelligence-based content development environments in which they conducted research for their assignments were positive. In addition, it is emphasized in the literature that chatbots should appeal to individuals with different characteristics (Mhlanga, 2023). In addition to minorities and individuals with special needs (Perez et al., 2020), specific arrangements should be made for individuals who differ in gender, age, skin color, and cultural identity (Okonkwo & Ade-Ibijola, 2021).

The responses of pre-service teachers regarding the effects of artificial intelligence-based content development environments on students were compiled under the codes of knowledge and technology skills. It is stated that perceived ease and perceived usefulness are effective in the acceptance of chatbots (Chocarro et al., 2023). The fact that individuals have technological competencies will also be effective in chatbot use cases. The lack of confidence and skills of teachers using technology is a major obstacle to the effective use of artificial intelligence in schools (Baker et al., 2019). In this case, teachers can determine how best to use chatbots in current technological development situations and therefore reduce limitations (Huang et al., 2022). Through AI-based content development environments, students will be able to access information quickly and easily. In addition, it will be possible to examine the researched information in more depth. In addition to these things, the pre-service teachers stated that artificial intelligence-based content development environments can have an effect on students, such as the ability to produce knowledge. As a result of the analysis of the

responses, it is thought that students can obtain various items of information by asking different questions in these environments to improve their thinking skills and strengthen their thinking skills by bringing them together. It was stated that such technological environments can also contribute to increasing students' technology usage skills. In the literature, the importance of artificial intelligence literacy in the effective use of artificial intelligence is mentioned (Knoth et al., 2024). In addition, it is stated that AI-based learning environments can create a novelty effect in students as they will improve learning outcomes in the short term (Fryer et al., 2017; Pérez et al., 2020; Wu & Yu, 2023). The 'Novelty effect' refers to the novelty of a technology for students which fades after students become more familiar with the technology (Huang et al., 2022).

The pre-service teachers evaluated their use of the AI-based content development environments in the contexts of student, course and professional development. There are pre-service teachers who stated that they would and those who would not direct their students to these environments. There are pre-service teachers who encourage the use of these environments due to the opportunities offered by these environments, as well as those who do not consider the use of these environments due to the concern that they may push students into laziness. This result is in line with the results of research indicating that ChatGPT may have negative effects on critical thinking and problem solving as it provides ready-made information (Markos et al., 2024). In the use of technology in education, the distinction between purpose and tool should be clearly made. Chatbot development in education is still driven by technology rather than a clear pedagogical focus on developing and supporting learning (Wollny et al., 2021). Artificial intelligence should be used as a tool, not as an end in education (Baker et al., 2019; Pişkin Tunç, 2024). The pre-service teachers stated that when they become teachers, they would mostly use these environments for course design or support. While using them for course purposes, they stated that they would be helped creating course content, developing materials or planning activities. Artificial intelligence is known to cause a paradigm shift in education (Mariappan & Krishnan, 2022; Mhlanga, 2023). In addition to topics such as artificial intelligence, literacy, and prompt engineering, curriculum development is emphasized. The need for curriculum development to improve the competencies of teachers and students in the current and future development of chatbots is mentioned (Tlili et al., 2023). There were also pre-service teachers who stated that they could use these environments in the context of professional development. The training of teachers and students on this subject is important in the use of ChatGPT in education (Lo, 2023). Supporting teachers on ChatGPT during the professional development process and training students by teachers will enable effective and correct use of ChatGPT. The pre-service teachers who would get ideas for developing content, materials or activities would also receive support in terms of professional development. It is stated that leaving the tasks of giving feedback or supporting teaching to chatbots during the teaching process can ease the burden on teachers (Perez et al., 2020; Zawacki-Richter et al., 2019).

When the opinions of the pre-service teachers regarding the future place of artificial intelligence-based content development environments are examined, the pre-service teachers stated that these environments will be in almost every area of life. Examples of these areas include education and training, research and development studies, search engines, and the business world. Studies in the literature indicate that artificial intelligence is used in many areas already, such as customer relations, education, health, and entertainment (Caldarini et al., 2022; Kalla & Smith, 2023). However, in addition to its widespread use, it is important to

emphasize its effective use. It is significant to emphasize that educational technology is not only about technology; we need to deal with the pedagogical, ethical, social, cultural and economic dimensions of artificial intelligence (Zawacki-Richter et al., 2019). In addition, the humanization of the technology used will determine its acceptance and future use. Future instructional designers should try to enhance students' learning outcomes by equipping AI chatbots with human-like avatars, gamification elements, and emotional intelligence (Wu & Yu, 2023). In addition, potential future areas of education that could benefit from the use of chatbots are examined in terms of technical developments, development of ethical principles, and usability testing (Okonkwo & Ade-Ibijola, 2021).

In this study, pre-service teachers' opinions on the use of ChatGPT, one of the artificial intelligence-based text generators, were taken. ChatGPT (GPT-3.5) was used in the study. This free ChatGPT version was preferred because it is accessible. In future studies, GPT-4.o technology, which accepts voice, text, image and video as input and responds faster (Open AI, 2024b), can be used. The research was conducted with pre-service teachers at a state university in the 2022-2023 academic year and the data were collected at one time. Future research could be carried out in a longitudinal way by spreading over long periods. In this study, interviews, one of the qualitative data collection techniques, were used. Using different types of data collection tools will strengthen the study. In this context, qualitative and quantitative data collection techniques could be used together in future studies. In line with the views of the pre-service teachers, more comprehensive and multivariate studies could be conducted on the use of artificial intelligence in teaching.

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