



The Contribution of Reality Technologies to Gastronomy Education: The Example of ChatGPT

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Abstract

Reality technologies can be used in many areas and can create significant effects. Reality technologies can be helpful in carrying out gastronomy education more efficiently and effectively. Therefore, this study focuses on understanding the role of reality technologies in gastronomy education in line with the answers obtained by asking semi-structured questions to ChatGPT, where the participant role is given. Qualitative data is used in the study. This data is analyzed with content analysis and in-depth information is obtained. As a result of the analysis, it has been determined that reality technologies can be used in gastronomy education, play a supportive and empowering role, make positive contributions to the education and training process, make the learning process more effective by visualizing theoretical lessons and provide a preliminary experience by creating practical lessons in a virtual environment. In addition, it is seen that reality technologies make gastronomy education more fun, attractive and innovative. While the significant advantages of reality technologies include reducing costs and waste, providing a safe learning environment, and increasing student motivation and creativity, high technical requirements and lack of physical kitchen experience are among their significant disadvantages. Additionally, the impact of reality technologies on gastronomy education can be examined through quantitative data or the responses of artificial intelligence chatbots can be compared.

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INTRODUCTION

The rapid advancement of technology has led to radical changes in every aspect of our lives and has led to the emergence of new generation innovations. One of the most striking of these innovations is reality technologies. Reality technologies are technologies that combine the physical world with the virtual world or create a completely virtual environment. These technologies offer new interaction and experience opportunities in a real or virtual world. Reality technologies include Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR) and Extended Reality (XR). While AR enriches the experience by adding virtual images, information or objects to the real world, VR can offer realistic experiences in a completely virtual world where unlimited content can be created and can also make it possible to realize experiences that cannot be done in real life or are risky. MR, which is the combination of AR and VR, creates an environment where the virtual and real worlds are integrated, allowing physical and digital objects to interact in real time. XR is an umbrella term (AR, VR, MR) that covers reality technologies that integrate the real and virtual worlds. XR enables the user to seamlessly transition and interact between the real and virtual worlds. These technologies, which can provide interactive and immersive experiences that combine the virtual and real worlds, are used in many areas, especially education. These technologies not only create entertaining experiences, but also offer students unique educational and teaching opportunities in the field of education. Reality technologies (VR, AR, MR, XR) show their impact in gastronomy education as well as in all areas thanks to their capabilities. These technologies offer an innovative learning approach that allows gastronomy students to have experiences that they cannot have in traditional classroom environments. Reality technologies can support educational processes and make learning experiences more efficient, fun, personalized and interesting. With simulated kitchen environments and virtual kitchen tools, practical skills can be acquired safely and without the worry of making mistakes, new techniques can be learned and students can improve themselves. Students can try out recipes without using physical materials and learn how kitchen equipment works. This both reduces educational costs and offers students a wider range of experiences. In addition, with the independence it provides in time and space, it creates the opportunity for students to repeat recipes and develop their culinary skills. These technologies offer students the opportunity to learn kitchen tools, cooking techniques and food preparation processes, while also allowing them to gain experience without facing the challenges of real-world environments. In addition, it increases students' motivation and provides a more effective learning experience. These developments enable gastronomy education to become more interactive and student-centered. It can also contribute to the creation of a more sustainable educational environment by preventing food waste. At the same time, it can make gastronomy education more efficient, safe and accessible, and increase the effectiveness of gastronomy education. Therefore, it is understood that reality technologies make significant contributions to gastronomy education. Another important innovation at this point is artificial intelligence.

Artificial intelligence can be defined as a set of technologies that can imitate human intelligence in solving complex problems. Artificial intelligence can personalize learning processes, help solve complex problems, and enable education and training to be more efficient, effective, and faster. Therefore, it is possible to say that artificial intelligence has opened a new door in gastronomy education. In addition, constantly improving and developing artificial intelligence technologies bring with them many different applications. ChatGPT, which has become a phenomenon today and is the most used in the field of education, is at the forefront of these advances. ChatGPT can establish human-like communication and interaction with its natural language processing and deep learning

capabilities. It can also give human-like answers to questions, solve complex problems, and have realistic natural dialogues (Ali & OpenAI, 2023; Tlili et al., 2023). ChatGPT can help in many ways, from lesson planning to curriculum design, from content creation to multi-faceted learning, from designing classroom activities to making lessons fun and interesting, from creating and evaluating theoretical and practical applications to reducing educators' workload (Ray, 2024). In addition, it adds significant value to gastronomy education in many areas, from creating recipes to creating virtual cooking assistants, from food and flavor analysis to learning cultural and historical information, from menu planning to presenting creative ideas, from providing flavor pairing and experiences in presentation techniques (Yiğit, 2023). At the same time, ChatGPT can also provide support in scientific studies and academic writing, and ChatGPT can also take on the role of a researcher or a participant (Ali & OpenAI, 2023; Barakazi, 2023; Fusté-Forné & Orea-Giner, 2023; Yiğit, 2023; Aktaş, 2024; Özdemir, 2024). Therefore, it is understood that ChatGPT plays an active role in the field of education and will bring new understandings. Thus, it is predicted that it will create radical changes in gastronomy education. As a result, it is understood that reality technologies have an important place in gastronomy education, will create changes in educational processes and these technologies will create a more comprehensive, effective and efficient educational environment. It is thought that artificial intelligence, which is thought to make different contributions in many subjects in the creation of these changes, will play an important role especially in terms of providing information. Therefore, in this study, it is aimed to understand the role of reality technologies in gastronomy education by directing research questions to ChatGPT, which assumes a participant role. It is thought that this study is important because it contributes to the use of reality technologies in gastronomy education, includes application examples in a practical and theoretical framework, and has a supporting quality in carrying out gastronomy education in a more efficient, effective and active way.

Conceptual Framework

Many innovations have emerged with the advancement of technology. At the forefront of these innovations are reality technologies. Reality technologies are technologies that combine the physical world with the virtual world. These technologies can offer realistic experiences as well as virtual experiences. This is related to the transition between a completely real environment and a completely virtual environment (Milgram & Kishino, 1994). Reality technologies are effective and versatile technologies that can be used in a wide variety of areas. These technologies can increase efficiency, enable the enrichment of experience and create innovative opportunities (Güngör, 2023). Reality technologies are listed as augmented reality (AR), virtual reality (VR), mixed reality (MR) and extended reality (XR). AR is defined as a direct or indirect real-time view of a physical real-world environment that is augmented by the addition of information generated by a virtual computer. AR is positioned in the real world both interactively and three-dimensionally and combines real and virtual objects (Carmigniani & Furht, 2011). The user sees the real world as virtual objects are placed or combined on the real world. Therefore, AR complements reality rather than completely replacing it (Azuma, 1997). VR is a new generation technology that offers realistic experiences in which a person can navigate, interact, and receive sensory feedback in a three-dimensional virtual environment created by a computer (Burdea & Coiffet, 2003; Sherman & Craig, 2003; Gutiérrez et al., 2008; Guttentag, 2010; Diemer et al., 2015). VR has the ability to simulate the real world. Thus, people can have realistic experiences in the virtual world. MR is defined as the merging of the real and virtual worlds to produce new scenarios and new environments where physical and digital objects coexist and interact in real time (Croatti & Ricci, 2018). The ability to move between these objects can provide the person with different perspectives and different angles. MR allows

the person to interact with virtual objects and manipulate these objects as if they were in the same place. In other words, the person can experience the feeling that one of their hands or feet is in an imaginary/virtual place while the other hand or foot is in the real world (Patel et al., 2020). For example, using a touch screen, a person can design their own kitchen or bathroom by selecting and moving virtual devices and installations in a digitally created room (PCMag Encyclopedia, 2019). MR integrates the real world with the virtual world and offers an immersive interaction. Blurring the distinction between the real and the virtual, MR contextually enhances the user's perception of the real world with additional information (Bulman et al., 2004). The person is positioned in the real world and digital content is integrated into his/her environment. Thus, the person can interact with both virtual and real world objects (Flavián et al., 2019, p. 550). Therefore, an immersive experience can be experienced where the real and the virtual are integrated. Another reality technology is extended reality. XR is an umbrella term that encompasses all reality technologies (Patel et al., 2020; Sharma, 2021). XR can be expressed as the combination of all real and virtual environments where the interaction between humans and machines occurs through interactions created by computer technology and hardware (Doolani et al., 2020).

Reality technologies are evident in the gastronomy field as in all fields. These technologies make significant contributions to both the application field and the education field of gastronomy. Reality technologies provide the opportunity to be involved in the experience, to integrate with the experience, thus increasing the quality of the experience, enriching and assimilating the experience. Thus, the person can get optimum benefit from the experience he/she is in. Reality technologies are becoming an innovation preferred by both customers looking for a unique experience and new generation restaurants such as Le Petit Chef, Ultraviolet, Sublimotion with the new generation experience approach they offer. In addition, reality technologies, which play a role in applications such as Aerobanquets RMX, Project Nourished, Vocktail, Key Enabling Beverage Appetite Platform (KEBAP), Virtual Cookie, AREasyCooking, transform and improve the eating and drinking experience (Çöl et al., 2023). Thus, a more entertaining, interactive, personalized and unique eating and drinking experience can be created. Therefore, it is seen that reality technologies have taken the gastronomy field into a completely different face. It is understood that these new generation technological developments make significant contributions to both the application field and the education side of gastronomy.

Reality technologies can serve as an effective learning tool. With its innovative structure, it can provide a unique learning experience that cannot be obtained from a traditional education format. Reality technologies, which have tremendous potential to improve teaching and learning experiences, offer a unique hands-on experience that other educational technologies cannot provide. Thus, student motivation and active learning can be improved (Duncan et al., 2012; Gregory et al., 2015; Stefan, 2016; Sharma, 2021). These new generation technologies can stimulate students' senses and involve them in learning activities (Sala, 2021, p. 48). For example, AR, which offers a direct or indirect view of the real-world environment enriched with computer-generated sensory inputs such as graphics, sound and video, can enrich the student's view of the world with virtual objects and provide information about the real environment. Reality technologies improve learning success and can increase students' motivation and interest. In addition, reality technologies provide multiple entry points for personal learning strategies and offer instructional paths that privilege an intuitive approach. Thus, increases in student achievement can be achieved (Chiang et al., 2014; Jee et al., 2014; Freina & Ott, 2015; Maas & Hughes, 2020; Tilhou et al., 2020; Sala, 2021, p. 50). AR can develop collaborative learning experiences and create an interactive learning environment (Billinghurst et al., 2001;

Wu et al., 2013). VR is an important tool that supports learning, facilitates teaching processes and prepares students for the real environment (Patel et al., 2020, p. 1069). VR can increase students' creativity and self-confidence skills and motivation. VR can provide more comfortable learning by eliminating risk elements that may be experienced in reality, disabled individuals can receive more active education, and students can learn by living thanks to VR (Roussou, 2004; Tepe et al., 2016). VR can make education fun and increase students' desire to participate in the lesson. In addition, students can repeat the education they receive where they are and improve their own knowledge and skills (Tang et al., 2018). Therefore, it is seen that AR and VR have positive effects on education. AR and VR can make difficult and dangerous environments more reliable and easily accessible. It can also increase student and teacher interaction and offer a different and fun education process (Kapucu & Yıldırım, 2019). MR can increase students' motivation and at the same time provide more comprehensive information during learning or education. In addition, the efficiency of the teaching and learning process can be increased. MR can create personalized learning by creating personalized content. It can also increase learning satisfaction and increase knowledge and skills (Chen & Duh, 2018). MR enables students to participate better in education, experience what they have learned, and make education more memorable (Tang et al., 2018). Therefore, it can be stated that reality technologies will become an effective tool in terms of education.

Reality technologies are effective in gastronomy education as well as in other educational fields. VR can create virtual kitchen environments with its ability to create real and unreal virtual environments. Thus, it is possible for students in kitchens with no kitchen facilities or limited facilities to learn about many subjects such as kitchen tools and equipment, cooking techniques, and types of cuisine. It can also enable students to gain experience and practice in terms of cooking (Ünür & Sünnetçioğlu, 2024). Therefore, VR can provide a learning acquisition in gastronomy education and can play a role as a reinforcement tool. In addition, VR can provide a preliminary experience before the lesson and ensure that the lessons are more prepared. This new generation learning experience makes the lessons more enjoyable and more internalized. VR can reflect forgotten recipes and the food culture of that period with its interactive and realistic experience creation. Thus, it can provide the experience of the culinary understanding of the past period. VR can offer opportunities such as independence of time and space and the ability to apply recipes over and over again without using materials. Therefore, it is understood that VR technology has positive effects on kitchen training. In addition, food waste can be prevented with the use of VR, and a fun, interesting, exciting and enjoyable educational experience can be made possible (Tepe et al., 2016; Ünür & Sünnetçioğlu, 2024). With the use of AR and VR, the dangers and risks in the kitchen can be eliminated and more risk-free, comfortable and kitchen training that can include younger age groups can be provided. These systems, which offer a virtual cooking environment, make it possible for students to receive cooking training in the virtual world without experiencing any danger. AR and VR can act as an interactive virtual assistant. Thus, they can help with recipes, how to prepare ingredients and how to cook by controlling the weight of ingredients. This can be achieved with scenarios such as the animation of the recipe on a real stove enriched with 3D graphics (Jang et al., 2007; Ergün et al., 2020). VR offers significant potential in terms of occupational safety and food hygiene training in the kitchen. VR technology can provide a cost-effective and safe way to improve safety training and reduce accidents (Saad et al., 2022). VR can serve as a tool for food portion size training (Celikcan et al., 2018). It can help chefs with food preparation techniques and develop new recipes (Çağman & Kalaycı, 2023). It can also provide significant benefits in improving students' skills and acquiring new skills in gastronomy education (Negüzel & Mil, 2021). It is seen that reality technologies can support students

in practice as well as in theory. Therefore, it can be stated that reality technologies can be useful in gastronomy education by creating and enriching a realistic experience and can optimize the quality of education and training.

As a result, it is possible to use reality technologies in gastronomy education. These technological innovations can affect, support and improve teaching methods. These technologies create new generation teaching scenarios and improve teaching, learning and collaboration. Thus, they can help strengthen the educational process and create new learning paths. In addition, reality technologies offer new potentials for engaging learning experiences (Sala, 2021), provide excellent simulations that are inaccessible in traditional classrooms and create learning environments where young generations integrate with experiences, are comfortable and participate more actively (Patel et al., 2020). Therefore, it can be said that reality technologies make significant contributions to gastronomy education and take gastronomy education to a completely different level thanks to the features and capabilities they contain. Another important innovation in technology is artificial intelligence (AI). AI is becoming an important tool used in many fields today. AI can be used to solve complex problems of simple or more complex systems (Coppin, 2004). AI is a set of technologies that can mimic human intelligence to solve problems and can apply rules similar to humans, develop over time, learn, and adapt to changes in the environment. It can also enable the performance of complex and intelligent tasks, reasoning, and many activities associated with human intelligence (McCarthy, 2007; Russell & Norvig, 2010). The term AI was first used in 1956 by John McCarthy at a conference held at Dartmouth College in Hanover, New Hampshire, and has undergone significant developments and changes over the years (Coppin, 2004). Thus, AI has begun to be used in many different fields. One of these fields is education. AI is an effective technology that facilitates decision-making in education and training environments, can make predictions, offers significant opportunities for improving the quality of education and training, helps with evaluations, data collection, and developing new strategies (Hwang et al., 2020). Therefore, it is seen that artificial intelligence has a significant transformative potential in education and training (Abuhassna et al., 2024, p. 700).

AI technologies are constantly advancing and becoming more visible in different aspects of life. As a result of these developments, one of the recent phenomena is ChatGPT, a chatbot with a conversational artificial intelligence interface developed by OpenAI. ChatGPT, one of the most advanced artificial intelligence applications, has attracted great attention in the world. In this context, it has become one of the most studied artificial intelligence applications in the field of education (Tlili et al., 2023). ChatGPT, one of the most famous chatbots today, uses machine learning to understand and produce human language. ChatGPT aims to support tasks that require natural language interaction, such as answering questions and providing information, and is designed to establish human-like communication and interaction with individuals. ChatGPT is a continuously improving, continuous learning system and can help with any question or information needed (Ali & OpenAI, 2023).

ChatGPT is more advanced in terms of scale compared to traditional chatbots (GPT-3: 175 billion parameters, GPT-2: 1.5 billion parameters). ChatGPT can offer a larger dataset as training data, more fine-tuning, more advanced capabilities, and more human-like text productions. ChatGPT, a generative artificial intelligence use based on natural language processing and deep learning, can produce human-like texts and create a conversational style that allows for more realistic natural dialogues (Tlili et al., 2023). Since ChatGPT uses deep learning models, it can provide human-like responses to complex and diverse prompts (questions, instructions, etc.), understand the needs of the user and provide comprehensive responses (Lim et al., 2023; Salvagno et al., 2023), and thus produce realistic and natural

dialogues (Tlili et al., 2023). ChatGPT can write a short text on a specific topic, provide information on a topic of interest, create an email or message in a specific tone, with specific content and to a specific person, correct the form of a text or change its words, and solve problems. Therefore, this chatbot can also be used in scientific writing. It becomes a promising and powerful tool for tasks such as automatic drafting, article summarization, and language translation. With this ability, it can be useful in academic activities to make the writing process faster and easier (King, 2023; Salvagno et al., 2023). ChatGPT can also act as a second researcher in an academic study or take on the role of a participant in the research (Ali & OpenAI, 2023; Özdemir, 2024). ChatGPT is constantly being improved with augmentation techniques, natural language processing, and machine learning to improve its ability to understand users' needs and respond comprehensively (Salvagno et al., 2023). These improvements have led to the emergence of ChatGPT-4. This chatbot makes it possible to understand the basic patterns of language. With a capacity of over 1 trillion, it has become one of the largest language models in existence, surpassing GPT-3. With this increased capacity, more complex and realistic texts can now be produced with higher accuracy. ChatGPT-4 is able to grasp the context and intended meaning of the text more clearly and provide greater control over the resulting material. ChatGPT-4 also appears to have improved multilingual understanding and production capabilities, even in low-resource languages that are difficult for language models to process. ChatGPT-4's groundbreaking development in natural language processing expands the boundaries of what can be achieved with AI-generated text. Its use is expanding due to its highly accurate and advanced capacity to understand and produce human-like text, from content creation to language translation (Oriakhi et al., 2024, p. 156). The effects of this development can also be seen in the field of education. It is seen that ChatGPT-4 has the potential to completely transform traditional approaches by creating a more dynamic, customized and easily accessible learning environment. The education sector is constantly looking for innovative ideas to significantly increase teaching effectiveness and learning outcomes, and ChatGPT-4 is leading this educational revolution with its advanced algorithms and comprehensive knowledge base. ChatGPT has extraordinary capabilities to perform complex tasks in the field of education (Oriakhi et al., 2024, p. 149). ChatGPT has the potential to produce complex text outputs, create highly original content (Khalil & Er, 2023), demonstrate critical thinking skills, and produce highly realistic texts with minimal input (Susnjak, 2022). With its unique capabilities, ChatGPT serves as a valuable resource for both educators and students, transforming the way knowledge is transferred and acquired (Ray, 2024). However, although ChatGPT has made significant impacts, its current capabilities are seen to be limited, creating concerns about privacy, security, and accuracy of information (Qadir, 2023, p. 9; Baidoo-Anu & Owusu Ansah, 2023, p. 52). It may be risky to assume that ChatGPT will provide completely reliable, credible, and accurate outputs (Trust et al., 2023). For this reason, it is important to verify the information obtained from ChatGPT with reliable sources (Pokkakillath & Suleri, 2023, p. 32). At this point, opinions of experts in the field can be obtained and a detailed literature review can be conducted.

Thanks to the impact created by ChatGPT and its capabilities, it is seen that studies are being carried out in many fields (Göktaş, 2023a, p. 894) as well as in the field of education (Ali & OpenAI, 2023; Iskender, 2023; Ivanov & Soliman, 2023; Tlili et al., 2023; Adeshola & Adepoju, 2024; Ray, 2024), in the world of gastronomy (Fusté Forné & Orea-Giner, 2023; Dalgıç, 2023; (Göktaş, 2023b; Binbaşıoğlu, 2024; Özdemir, 2024) and in the field of gastronomy education (Yiğit, 2023). ChatGPT's ability to create detailed insights at the point of education allows educators to enrich their lesson plans and to offer more comprehensive and versatile learning experiences. It can also be a powerful tool in the development of curriculum designs and content creation processes. ChatGPT can help

increase the depth and breadth of teaching materials, make lessons more informative and engaging, and design better assessments and in-class activities. ChatGPT can produce various questions and scenarios that are compatible with the curriculum and help evaluate students' understanding and application of concepts. In this way, educators' workload can be reduced and more time can be created to focus on student-teacher interaction and feedback, which are very important for learning (Ray, 2024). In terms of gastronomy education, it is stated that it can help in creating recipes, providing flavor matching and experiences, personalizing nutrition, creating virtual cooking assistants, performing food and flavor analysis, providing creative meal ideas, transferring cultural and historical information, menu planning, presentation techniques, gastronomy trends and gastronomy knowledge and terminology, and it is also stated that it can serve as a resource that can provide support to educators and students in terms of gastronomy education (Yiğit, 2023).

As a result, it is understood that reality technologies will make significant contributions to gastronomy education. It is also seen that ChatGPT can provide support for the use of reality technologies in gastronomy education. From this point on, the aim of this study is to understand the role of reality technologies in gastronomy education by asking questions to ChatGPT, which is given the role of a participant. It is thought that this study is important because it understands how reality technologies can play a role in gastronomy education and presents the advantages and disadvantages of these technologies, includes practical and theoretical application examples, has a supporting feature in carrying out gastronomy education more efficiently, effectively and actively, and provides useful information to practitioners about the use of reality technologies in the education-training process. In addition, it can be stated that the study is important because it will provide new data to researchers and the literature regarding the consistency, accuracy and use of the information obtained with ChatGPT. It is also thought that it can inspire researchers to conduct various relational and causal studies by adding new perspectives within the framework of gastronomy education.

Method

This study, which focuses on understanding the role of reality technologies in gastronomy education, utilizes qualitative data. It is thought that this study is important because it guides practitioners in the use of reality technologies in gastronomy education, provides information about the advantages and disadvantages of these technologies, includes application examples in a practical and theoretical framework, and has a helpful nature in carrying out gastronomy education more efficiently.

The universe of the study consists of chat-based artificial intelligence applications, while the sample consists of ChatGPT artificial intelligence application. Convenience and purposeful sampling methods are used in the research. Thus, the objectives of the study can be reached more easily and quickly (Kozak, 2015, p. 118) and detailed examination of certain situations, events and phenomena in line with the purpose of the study can be provided (Kurtuluş, 2010; Tarhan, 2015; Yıldırım & Şimşek, 2016). The data of the study were obtained by interview technique and semi-structured questionnaire. The limitations of the study can be stated as the data obtained from a single artificial intelligence application, the collection of data at certain time intervals and the defined character assignment. In addition, the ethics committee permission required to collect the data used in the research was obtained from Antalya Belek University Ethics Committee dated 09.04.2025 and numbered 61/19. It is also important to develop the procedure for the use of artificial intelligence in education and scientific production (Pokkakillath and

Suleri, 2023).

Interview questions were prepared by reviewing the literature and obtaining expert opinions. These interview questions were asked in Turkish to ChatGPT-4o (Barakazi, 2023; Fusté-Forné and Orea-Giner, 2023; Yiğit, 2023; Aktaş, 2024; Özdemir, 2024), who was defined as “a participant who worked as a chef for many years and is an expert in reality technologies”, on three different days between 10.04.2025 and 16.04.2025. The reason for making this definition is that it is thought that the data can be obtained in a more result-oriented way in line with the purpose of the study. It is observed that ChatGPT-4o showed consistency by giving the same answers to the questions asked (Yiğit, 2023; Özdemir, 2024). In addition, due to the concerns about the accuracy of the information in ChatGPT responses (Qadir, 2023, p. 9; Baidoo-Anu & Owusu Ansah, 2023, p. 52) and the need to verify the information obtained from reliable sources (Pokkakillath & Suleri, 2023, p. 32), ChatGPT data were evaluated by 11 experts (six assistant professors, three lecturers, two research assistants) who have knowledge or experience in reality technologies and artificial intelligence in the field of gastronomy. Thus, it is thought that the relevant concerns were eliminated and reliable study data were obtained.

ChatGPT was preferred because it has a larger dataset and more advanced capabilities, produces more human-like texts for complex and diverse prompts (questions, instructions, etc.), allows for more realistic natural dialogues, provides more comprehensive responses by understanding the user's needs, can be used in scientific writings (Lim et al., 2023; Salvagno et al., 2023; Tlili et al., 2023; Oriakhi et al., 2024), can create highly original content (Khalil & Er, 2023), is one of the most advanced artificial intelligence applications that have attracted great attention in the world and one of the most studied artificial intelligence applications in the field of education (Tlili et al., 2023), and can take part in a study as a participant and researcher. However, the methodological structure of this study is also supported by other studies (Ali & OpenAI, 2023; Barakazi, 2023; Fusté-Forné & Orea-Giner, 2023; Yiğit, 2023; Aktaş, 2024; Carvalho & Ivanov, 2024; Özdemir, 2024). The data obtained from ChatGPT were analyzed with content analysis. Content analysis determines the presence of certain words or concepts in texts or text groups, examines the meaning and relationships, and enables inferences to be made. Content analysis is an intellectual process that separates similar entities into clusters or conceptual categories in order to identify consistent patterns and relationships between variable objects and themes with qualitative textual data. Thus, researchers can obtain detailed and useful information (Güçlü, 2019, pp. 167-169). The information obtained as a result of the analysis was interpreted and presented in the findings section.

Findings and Comments

This part of the study includes the contribution of reality technologies to gastronomy education in line with the answers given by ChatGPT to the research questions and expert evaluations regarding ChatGPT answers. These findings are presented in Table 1 below.

Table 1. Findings Regarding ChatGPT Responses and Expert Opinions

ChatGPT ANSWERS		Expert Opinions (n:11)					
		I disagree		I'm undecided		I agree	
		n	%	n	%	n	%
Question 1: Is it important to use reality technologies in gastronomy education? Why?							
Supports Experiential Learning	With reality technologies, students gain one-on-one experience in a virtual environment. In this way, they are better prepared for the real kitchen process.	1	9,1	2	18,2	8	72,7
Reduces Cost and Waste	Reality technologies allow students to receive training without using real-life ingredients (such as cooking techniques and plate presentations), thus preventing food waste in the real world and reducing costs.	-	-	1	9,1	10	90,9
Increases Accessibility	Students who do not have access to a physical kitchen environment receive culinary education with reality technologies (VR simulations, etc.).	-	-	3	27,3	8	72,7
Strengthens the Process of Making Mistakes and Learning	Reality technologies provide feedback when incorrect techniques are applied or mistakes are made, ensuring that correct techniques are learned, thus strengthening the learning process.	-	-	1	9,1	10	90,9
Makes Gastronomy Education More Attractive and Innovative	Reality technologies make gastronomy education more attractive and innovative. For example, culinary cultures of different countries are explored through 3D modeling, thus transferring international culinary knowledge more effectively.	-	-	-	-	11	100
Question 2: How do reality technologies contribute to gastronomy education?							
Strengthening Applied Education	<i>Virtual Reality (VR) Simulations:</i> Students can experience knife techniques, cooking processes, and plate arrangement in a VR kitchen environment (<i>For example</i> , a Michelin star restaurant's kitchen can be visited with VR and the working system there can be learned). <i>Augmented Reality (AR) Supported Recipes:</i> Through AR glasses or mobile applications, students can receive real-time visual guidance while implementing a recipe (<i>For example</i> , students can compare how a dessert should be in AR).	1	9,1	1	9,1	9	81,8
Learning by Making Mistakes and Feedback Mechanisms	<i>VR simulations</i> , allow students to safely perform experiments that they cannot do in a real kitchen environment (<i>For example</i> , incorrect knife use or incorrect hygiene practices can be simulated with VR and instant feedback can be given to the student). <i>Thanks to audio and visual warnings</i> , students can instantly notice and correct their mistakes (<i>For example</i> , the VR system can warn the student when the cooking time is set incorrectly).	1	9,1	1	9,1	9	81,8
Reducing Costs and Waste	<i>Real culinary education requires material consumption</i> , which increases costs. Thanks to VR and AR technologies, students can experience recipes in the real world without consuming materials (<i>For example</i> , with an AR-supported application, students can digitally design plate presentations of dishes, thus preventing food waste).	-	-	1	9,1	10	90,9
Making Education More Accessible and Flexible	<i>Online gastronomy training</i> can be made much more effective with VR. Students who do not have access to a physical kitchen can receive hands-on training thanks to VR kitchens. In addition, thanks to AR-supported recipes and guides, students can learn at their own pace and repeat certain stages.	-	-	1	9,1	10	90,9
Developing Gastronomy Culture and Creativity	<i>Virtual Tours and Cultural Experiences:</i> Students can take virtual trips to different countries' cuisines with VR technology and receive one-on-one training from a sushi master in Japan or a pastry chef in France. <i>Developing New Recipes and Techniques:</i> AR and VR help students be more creative in the kitchen by allowing them to test different ingredients and techniques in a digital environment.	-	-	-	-	11	100

Table 1. Findings Regarding ChatGPT Responses and Expert Opinions

Question 3: What can be done in gastronomy education using reality technologies?									
Interactive Kitchen Simulations with Virtual Reality (VR)	<i>Training in a Professional Kitchen Environment:</i> Using VR glasses, students can virtually enter the kitchen of a Michelin-starred restaurant and observe the operations there.	-	-	1	9,1	10	90,9		
	<i>Real-Time Scenarios:</i> In VR simulations, students can learn how to manage orders during busy hours in a restaurant. This can improve their decision-making skills under stress.								
	<i>Hygiene and Safety Training:</i> In a VR environment, students can receive hands-on training on topics such as safe knife use, fire prevention, and cross-contamination risks.								
Visually Supported Education with Augmented Reality (AR)	<i>Step-by-Step Cooking Guides:</i> Students can follow the directions that appear on the screen while implementing a recipe through AR glasses or mobile applications.	-	-	1	9,1	10	90,9		
	<i>Plate Presentation and Design with 3D Modeling:</i> With AR technology, students can virtually see how a dish should be presented and create the best presentation by trying out plate designs in a digital environment.								
	<i>Ingredient and Material Recognition:</i> Students can learn nutritional values, storage conditions and alternative ingredients by scanning ingredients with an AR-supported application.								
Hands-On and Experiential Learning with Mixed Reality (MR)	<i>Real-Time Education and Guidance:</i> With MR glasses, an instructor can connect remotely, observe the student's actions and provide real-time feedback.	1	9,1	1	9,1	10	81,8		
	<i>One-on-One Lessons from Virtual Masters:</i> With MR technology, a student can cook with a virtual avatar of a world-famous chef and receive one-on-one training from him.								
	<i>Interactive Menu Design:</i> With MR, students can experience a restaurant's menu in 3D and even test different menu designs in a virtual environment.								
Distance Gastronomy Education	<i>Globalizing Education:</i> Students who do not have access to a physical kitchen can receive hands-on training remotely with VR and AR-supported kitchen simulations.	-	-	1	9,1	10	90,9		
	<i>Live Virtual Workshops and Workshops:</i> Chefs from different parts of the world can provide one-on-one training to students by organizing interactive workshops in a virtual environment.								
	<i>Virtual Cultural Kitchen Tours:</i> Students can visit markets in different countries, learn about local ingredients, and experience cultural cuisine using VR.								
Supporting Creativity and Innovation with Reality Technologies	<i>Developing New Recipes:</i> With AI-powered VR kitchens, students can create new recipes by mixing different ingredients in a virtual environment.	-	-	2	18,2	9	81,8		
	<i>Molecular Gastronomy Experiments:</i> With VR simulations, advanced gastronomy techniques such as liquid nitrogen, foaming techniques or gelatinization can be applied in a safe environment.								
	<i>Sustainability Training:</i> Interactive simulations on waste management can be developed with AR and students can learn waste reduction strategies.								

Table 1. Findings Regarding ChatGPT Responses and Expert Opinions (cont.)

Question 4: How do reality technologies contribute to practical and theoretical courses in gastronomy education?									
<i>Contributions for Applied Courses</i>									
(Reality technologies allow students to learn the experiences they may encounter in a physical kitchen environment by living them in a virtual environment)									
Kitchen Simulations with Virtual Reality (VR)	<i>Realistic Kitchen Experience:</i> Using VR headsets, students can virtually enter a restaurant kitchen and try different recipes in practice.	1	9,1	3	27,3	7	63,6		
	<i>Knife Techniques Training:</i> With VR simulations, students can improve knife grip, chopping techniques and cutting speed. If they make a wrong move, the system can provide feedback so they can correct their mistakes.								
	<i>Time Management and Stress Management Training:</i> Students can work in a busy kitchen in a VR environment and learn how to prepare orders on time and coordinate in the kitchen.								
Real-Time Guidance with Augmented Reality (AR)	<i>Step-by-Step Recipe Apps:</i> AR glasses or mobile apps allow students to follow recipes and cooking instructions with 3D visuals while cooking.	-	-	-	-	11	100		
	<i>3D Plate Presentation Design:</i> Students can see how a plate should be arranged in AR and digitally simulate the plate design.								
	<i>Food Chemistry and Molecular Gastronomy:</i> With AR technology, students can visually examine the chemical reactions of ingredients and cooking processes. <i>For example</i> , observe the effect of temperature changes on chocolate or dough.								
Real-Time Feedback with Mixed Reality (MR)	<i>Virtual Chef Training:</i> With MR glasses, students can learn recipes step by step, guided by a digital avatar of a famous chef.	1	9,1	-	-	10	90,9		
	<i>Error Analysis and Correction:</i> MR-supported systems can detect student movements and provide instant warnings in cases such as incorrect cutting, incorrect cooking time or hygiene violations.								
<i>Contributions for Theoretical Courses</i>									
(Reality technologies make the learning process more effective by visualizing the theoretical lessons of gastronomy education)									
Exploring Cultural and Historical Cuisine with VR	<i>Virtual Food Culture Tours:</i> Using VR glasses, students can visit the cuisines of different countries, visit local markets and learn about food cultures. <i>For example</i> , they can explore Ottoman cuisine or Japanese Kaiseki food culture with VR.	-	-	-	-	11	100		
	<i>Bringing Historical Foods to Life:</i> With VR simulations, students can learn how food was cooked in the past and what ingredients were used to make these dishes.								
Food Safety and Nutrition Education with AR	<i>Nutrition Analysis:</i> AR apps can make nutrition education interactive by displaying calorie, protein, fat, and carbohydrate values when held over an ingredient.	-	-	2	18,2	9	81,8		
	<i>Food Hygiene and Safety:</i> Students can learn hygiene rules in action with AR-supported simulations. <i>For example</i> , they can visually examine which ingredients should be prepared on which cutting boards to prevent cross-contamination.								
Restaurant Management and Menu Planning with MR	<i>Restaurant Simulations:</i> Students can virtually design a restaurant kitchen and service area with MR and learn to manage customer flow.	-	-	2	18,2	9	81,8		
	<i>Virtual Menu Tests:</i> Students can digitally design a new menu with MR, analyze customer feedback, and determine the best menu options.								

Table 1. Findings Regarding ChatGPT Responses and Expert Opinions (cont.)

Question 5: What are the advantages and disadvantages of integrating reality technologies into gastronomy education?									
<i>Advantages</i>									
Strengthening Applied Learning	<i>Virtual kitchen experience:</i> Students can work one-on-one in a kitchen environment with VR simulations, learning cutting, chopping and cooking techniques by practice. <i>Real-time guidance:</i> AR-supported recipes and techniques provide step-by-step guidance to students while cooking.	2	18,2	1	9,1	8	72,7		
Reducing Costs and Waste	<i>Minimize material consumption:</i> Cooking in a real kitchen environment requires the use of materials and equipment. VR and AR technologies make it possible to learn in a virtual environment without using physical materials. Thus, material waste is reduced. <i>Reduce the cost of making mistakes:</i> Students can correct their mistakes in cutting, cooking or arranging plates in a virtual environment, thus minimizing their mistakes in a real kitchen.	1	9,1	-	-	10	90,9		
Providing a Safe Learning Environment	<i>Protecting against burns, cuts, and other kitchen accidents:</i> Virtual simulations allow students to safely learn risky kitchen procedures. <i>Supporting hygiene and sanitation education:</i> AR interactively teaches topics such as contamination risks, hygiene protocols, and kitchen safety.	-	-	2	18,2	9	81,8		
Increasing Accessibility	<i>Distance gastronomy education:</i> Students who do not have access to a physical kitchen can receive hands-on training in VR kitchen environments. <i>Opportunities for individuals with disabilities:</i> Individuals with mobility limitations can participate in gastronomy education through virtual kitchen experiences.	-	-	2	18,2	9	81,8		
Increasing Student Motivation and Creativity	<i>Interactive and fun learning process:</i> VR and AR supported trainings provide a more engaging and memorable experience. <i>New recipe and presentation experiments:</i> Students can develop creative presentations by making AR supported 3D plate designs.	1	9,1	-	-	10	90,9		
<i>Disadvantages</i>									
High Cost and Technical Requirements	<i>Cost of VR/AR devices:</i> High-quality VR headsets, AR glasses, and simulation software can be expensive, and not every educational institution can make this investment. <i>Requires powerful computer infrastructure:</i> High-performance computers are needed to run VR applications.	-	-	-	-	11	100		
Lack of Physical Experience	<i>Lack of real sensory experiences:</i> VR/AR technologies support visual and auditory learning, but cannot fully convey taste, smell and touch experiences. <i>Failure to fully reflect real kitchen dynamics:</i> Cooking can be experienced in a VR environment, but heat, tactile feedback and real-time kitchen stress may be missing.	-	-	-	-	11	100		
Technical Issues and User Experience Challenges	<i>Requires training on device use:</i> For effective use of VR and AR technologies, both students and instructors need prior technical training. <i>Risk of motion sickness:</i> VR use can cause dizziness and nausea in some people.	-	-	-	-	11	100		
The Risk of Moving Away from Traditional Learning Methods	<i>Reduced instructor-student interaction:</i> Virtual simulations can make it difficult for instructors to intervene directly and can discourage personalized feedback. <i>Inadequate preparation for working in a real kitchen:</i> Students who are taught entirely in a digital environment may not be adequately prepared for the physical challenges they may face in a real kitchen.	-	-	-	-	11	100		

Table 1. Findings Regarding ChatGPT Responses and Expert Opinions (cont.)

Expert Opinions on Reality Technologies and ChatGPT (n:11)						
QUESTIONS	I disagree		I'm undecided		I agree	
	n	%	n	%	n	%
Can reality technologies (AR, VR, MR, XR) be used in gastronomy education?	-	-	1	9,1	10	90,1
Do reality technologies (AR, VR, MR, XR) contribute to gastronomy education?	-	-	1	9,1	10	90,1
Do you think that reality technologies (AR, VR, MR, XR) have an important place in gastronomy education?	1	9,1	2	18,2	8	72,7
Do you find ChatGPT's answers to questions satisfactory?	1	9,1	3	27,3	7	63,6
Do you find ChatGPT's answers to questions successful?	1	9,1	3	27,3	7	63,6

When ChatGPT responses regarding the contribution of reality technologies to gastronomy education are evaluated, it is seen that these technologies have an important place in gastronomy education and provide valuable contributions. Reality technologies can contribute to the development of students by supporting experiential learning. Students can receive one-on-one training equivalent to the real world in a virtual environment. In this way, they can increase their knowledge and skill levels and be more prepared for the operations in a real kitchen. For example, students can take part in a Michelin-starred restaurant kitchen using VR glasses and observe the operations there, and learn how to manage orders during busy hours in a restaurant with VR simulations. In addition, students can receive one-on-one training on topics such as knife use training, fire prevention/extinguishing training, and cross-contamination risk training in a safe VR environment. Therefore, reality technologies can create a comfortable, safe, and effective learning environment and can also play the role of a pre-experience tool for physical kitchen education. At the same time, it seems possible to strengthen the efficiency and quality of gastronomy education thanks to reality technologies. Students can experience chopping techniques, cooking processes, and plate design in a VR kitchen environment, or compare how a dessert should be with AR glasses. In addition, reality technologies can improve students' learning processes with real-time feedback. For example, in cases such as incorrect knife use, incorrect hygiene practices, and incorrect cooking times, reality technologies can detect the situation and provide one-on-one feedback to the student, helping them learn the correct techniques. In addition, students can follow a recipe step by step using AR technology, see important points in plate design, and learn the nutritional values or storage conditions of a food. Therefore, it can be said that reality technologies can be an effective tool in improving the gastronomy education process and increasing the quality of education.

Another point is that reality technologies make gastronomy education accessible to everyone. Students who do not have physical kitchen facilities can receive culinary education through applications such as live virtual workshops, VR workshops and VR kitchens. For example, students can cook with a virtual avatar of a world-famous chef using MR technology. Therefore, students can receive their education whenever they want, wherever they want and in their own comfortable areas with reality technologies that make distance education possible. In addition, students can repeat these trainings as many times as they want and improve the aspects they find inadequate. Therefore, reality technologies can increase the quality of learning as an efficient educational tool and create an accessible educational opportunity. However, it is important to provide the necessary hardware and software infrastructures for this education to be carried out. Apart from this, students need to meet certain needs in practical courses in order to carry out their education. At this point, these requirements are eliminated with the virtual

environment and applications created by reality technologies. This reduces the cost that students spend for education. It is also seen that it contributes to the elimination of food waste in practical kitchen courses and therefore to sustainability. This is mainly due to the fact that gastronomy training is carried out in a virtual environment (such as learning chopping techniques in a VR environment) without using or purchasing food as in the real world. Therefore, it can be stated that reality technologies can be a tool for more sustainable training and offer significant gains in terms of cost.

Another important issue is that reality technologies make gastronomy education more attractive and can improve students' creativity. For example, students can receive training from a sushi master in Japan or a pastry chef in France, create new recipes or experience new techniques by mixing different ingredients in a virtual environment thanks to VR kitchens supported by artificial intelligence, visit the markets of different countries with virtual tours, VR simulations and 3D modeling, get to know their local ingredients and discover different culinary cultures. Therefore, it is possible to say that reality technologies take gastronomy education to a more entertaining and interesting stage. It is also understood that it is an important application tool in developing students' creativity. In addition, reality technologies provide various application opportunities in theoretical courses (discovering cultural and historical cuisine with VR - reviving historical dishes -, food safety and nutrition education with AR, restaurant management and menu planning education with MR) and practical courses (kitchen simulations - chopping techniques education -, real-time guidance - step-by-step recipe application-, real-time feedback -education with a virtual chef-) and make significant contributions to students' education. Reality technologies can visualize, narrate and animate theoretical lessons in gastronomy. At the same time, they can allow practical lessons to be experienced as in the real world. Therefore, it can be stated that reality technologies can make the learning process more effective, the information obtained can be more memorable, and an innovative and participatory education can be created. Therefore, it is possible to say that reality technologies can be used in gastronomy education thanks to their capabilities and applications.

This effective technology also has advantages and disadvantages in gastronomy education. While the advantages of reality technologies include strengthening learning, reducing costs and waste production, creating a safe, accessible, interactive and fun educational environment, and increasing motivation and creativity, high costs and technical requirements, lack of physical experience, technical problems and difficulties related to experience, moving away from traditional learning methods, cyber sickness, reduced interaction between instructor and student, lack of real sensory experiences, inability to fully reflect real kitchen dynamics and not being sufficiently prepared to work in a real kitchen are among the disadvantages of reality technologies. As a result, when using reality technologies in gastronomy education, it seems important to take these elements into consideration and design the education accordingly for optimum benefit.

When the ChatGPT responses of the experts regarding the contribution of reality technologies to gastronomy education are evaluated, the vast majority of the experts state that reality technologies can be used in gastronomy education (90.1%) and will contribute to gastronomy education (90.1%). In addition, the level of agreement that reality technologies have an important place in gastronomy education can be considered relatively high (72.7%). However, it is understood that the level of agreement that the answers given by ChatGPT to the questions are satisfactory and successful is low compared to the others (63.6%). This situation may be due to the fact that the

answers given by ChatGPT to the questions consist of superficial and repetitive answers. In addition, while it is stated by the experts that sensory feedback (smell of the food, tasting the food, grasping the knife, etc.) is important for learning to take place in applied kitchen trainings (U1, U2), it is stated that reality technologies can make more contributions, especially in the theoretical framework (U1). Therefore, it can be said that ChatGPT responses are partially insufficient and the satisfaction level is also partially low. However, it is anticipated that this situation can be resolved by asking detailed and multiple questions to ChatGPT. In addition, this result may be due to the importance of students being in touch with the physical kitchen and having one-on-one contact with kitchen tools and equipment, carrying out their practical training by experiencing that atmosphere in the real kitchen, having close interaction with instructors in physical kitchen environments, and students learning kitchen training by experiencing it in order to improve themselves in gastronomy training.

In the evaluation of the importance of reality technologies in gastronomy education, it is thought that reality technologies will make gastronomy education more attractive and innovative (100%). However, it is seen that the participation level is low in terms of experiential learning (72.7%) and accessibility (72.7%). It is seen that reality technologies can create various trainings and applications in terms of gastronomy (> 81%) and contribute to gastronomy education (> 81%). At this point, especially experiencing different culinary cultures and developing creativity have the highest participation level (100%). When considered in terms of the contributions that reality technologies can create for practical courses, it is understood that the real-time guidance application has the highest participation level (100%) while the lowest participation level is in kitchen simulations (63.6%). It is seen that the highest participation level for theoretical courses is the application of discovering cultural and historical cuisine (100%). When the advantages and disadvantages of reality technologies are examined, it is understood that the lowest participation in terms of advantages is strengthening applied learning (72.7%), while all disadvantages have the highest participation level (100%). These results can be explained by the fact that the use of software and hardware tools of reality technologies is not widespread, they are costly, the need for culinary education to be experienced in the real world, the ability of reality technologies to create different culinary cultures and to provide interaction and feedback to students in a virtual kitchen environment.

Conclusions and Recommendations

In this study, research questions are asked to ChatGPT, which is given the participant role, to understand the role of reality technologies in gastronomy education. It is thought that this study is important because it has a supporting feature in carrying out gastronomy education more efficiently, effectively and actively through reality technologies.

It is seen that reality technologies have taken their place as an innovative approach in gastronomy education. It is thought that these innovative tools will make significant contributions to traditional gastronomy education. It is possible to say that reality technologies will positively affect students' learning outcomes and learning processes thanks to their ability to create experiences equivalent to the real world and enrich real-world experiences. In addition, students can prepare for real-world gastronomy education and gain preliminary experience by carrying out their gastronomy education in a virtual environment (Jang et al., 2007; Ergün et al., 2020; Patel et al., 2020). This can make learning faster, more memorable and more permanent (Tang et al., 2018). Reality technologies can provide students with an experience about restaurant and kitchen operations. Thus, students can learn about time, stress and kitchen management. In addition, it can be stated that gastronomy education will be more fun, interesting, innovative

and more efficient (Kapucu and Yıldırım, 2019; Sala, 2021). Therefore, it is envisaged that reality technologies can support experiential learning.

Reality technologies can contribute to students with limited access to physical kitchen education in terms of receiving their education. However, it is thought that this accessibility will be possible when reality technologies are more widespread and accessible. With reality technologies, students can receive training that is risky in the real kitchen safely and comfortably in the virtual environment. Trainings given in the virtual environment can be repeated whenever and wherever desired (Tang et al., 2018). This can make gastronomy education more flexible by eliminating space and time dependency. Thus, students can come together with famous chefs in the virtual environment and benefit from their experiences. Reality technologies can provide feedback and allow students to see their mistakes. Thus, students can improve themselves and take their creativity to higher levels. It can also play an important role in increasing students' motivation (Roussou, 2004; Negüzel and Mil, 2021).

Since gastronomy education can be provided in the virtual environment with reality technologies, students' expenses, especially in kitchen education, can be reduced. In addition, this can make sustainable kitchen education more possible and eliminate food waste in the kitchen (Saad et al., 2022). Thanks to the fact that reality technologies can animate, visualize, narrate and transform theoretical courses such as culinary culture and food safety into experiences, students can learn their theoretical courses by living them. This allows for a more effective and more permanent education. Apart from this, it seems possible to experience culinary cultures in different regions that are difficult to learn on site, to learn new information and to have an idea about different culinary techniques.

Reality technologies allow practical courses to be learned in a way that is close to reality. Reality technologies can make positive contributions to the quality of education and learning processes of students with applications such as providing real-time guidance, creating realistic simulations and providing simultaneous feedback (Chiang et al., 2014; Freina and Ott, 2015; Tilhou et al., 2020; Sala, 2021). Therefore, it is understood that gastronomy education carried out in a virtual environment cannot surpass gastronomy education in the physical world and that reality technologies only have a supporting role. However, it can be assumed that this situation may change with the developments in reality technologies in the coming years.

While reality technologies have disadvantages such as high cost, technical requirements and lack of physical kitchen experience, they also offer advantages such as providing a preparation and preliminary experience for physical kitchen training, creating a safe and entertaining training environment, increasing motivation and creativity and eliminating food waste. Therefore, it is seen that reality technologies can be used in gastronomy training and will make significant contributions. At this point, it is thought that it is important to integrate reality technologies correctly with physical kitchen training.

Finally, this study can provide information about the performance of ChatGPT by taking on a participant role and can guide practitioners on the subject. It can be said that ChatGPT produces appropriate, sufficient and successful answers to the subject as a participant (Lim et al., 2023; King, 2023; Salvagno et al., 2023; Tlili et al., 2023). However, it is possible to say that it remains superficial for detailed studies. At the same time, it can be stated that when questions are repeated, similar answers are given and this is important for consistency. However, it is seen that there are repetitive answers with similar meaning and content in the answers given by ChatGPT to the research questions. It is assumed that this situation may create significant problems in the in-depth studies of the researchers.

However, it is foreseen that ChatGPT can be effective by asking detailed, in-depth and multiple questions in a small study area. Therefore, it is understood that ChatGPT needs to be developed technically at this point (Trust et al., 2023). Therefore, it can be said that ChatGPT can take on a participant role in a study (Ali and OpenAI, 2023; Barakazi, 2023; Fusté-Forné ve Orea-Giner, 2023; Yiğit, 2023; Aktaş, 2024; Özdemir, 2024), while it is thought that the answers given need to be evaluated by experts (Pokkakillath ve Suleri, 2023). Based on this, researchers need to pay attention to this point while conducting their studies on the subject. It is thought that this situation will contribute to the reliability of the study.

In line with this study, the impact of reality technologies on gastronomy education can be examined through quantitative data, experimental studies can be conducted, ChatGPT results can be compared with experimental studies, the responses of various artificial intelligence chatbots can be compared, and studies can be conducted by asking ChatGPT in-depth questions on different topics such as sustainable gastronomy. In addition, students can be asked to evaluate and improve the recipes prepared by ChatGPT. Thus, students' creativity and recipe analysis skills can be developed. Students can be given tasks to find, correct, and analyze hygiene errors through scenarios prepared with ChatGPT. At the same time, it can be used in theoretical courses such as gastronomy history, molecular gastronomy, cultural cuisines and contribute to the reinforcement of concepts by providing alternative sources, explanations, and visuals.

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Appendix 1. ChatGPT'ye Sorulan Sorular ve Yanıtları

ChatGPT'ye Sorulan Sorular ve Yanıtları		
<p>"Gerçeklik Teknolojilerinin Gastronomi Eğitimine Katkısı: ChatGPT Örneği" adlı bir makale yazıyorum. Bu makale için yarı yapılandırılmış görüşme soruları hazırladım. Bu görüşme sorularını sana soracağım. Sen bir katılımcı rolü üstlenerek sorulara ayrıntılı ve örnekler vererek cevap ver.</p> <p>Tabii! Uzun yıllar şef olarak çalışmış ve gerçeklik teknolojileri konusunda uzman bir katılımcı olarak, sorularınıza ayrıntılı yanıtlar vereceğim. Sorularınızı bekliyorum.</p> <p>Soru 1: Gerçeklik teknolojilerinin gastronomi eğitiminde kullanılması önemli midir? Neden?</p> <p>Evet, gerçeklik teknolojilerinin gastronomi eğitiminde kullanılması son derece önemlidir. Bunun birkaç temel nedeni var:</p> <ol style="list-style-type: none"> Deneyimsel Öğrenmeyi Destekler Gastronomi eğitimi büyük ölçüde uygulamalı deneyime dayanır. Sanal gerçeklik (VR) ve artırılmış gerçeklik (AR) gibi teknolojiler, öğrencilerin güvenli bir ortamda birebir deneyim kazanmalarını sağlar. Örneğin, VR ile bir mutfak simülasyonunda bıçak teknikleri veya yangın güvenliği eğitimi almak, öğrencilerin gerçek mutfakta daha hazırlıklı olmalarına yardımcı olabilir. Maliyet ve İsrafı Azaltır Geleneksel gastronomi eğitimi, yoğun malzeme kullanımı gerektirir. Etkili bir eğitim süreci için çok sayıda malzeme harcanabilir. Ancak AR veya VR simülasyonları ile öğrenciler, malzeme tüketmeden pişirme tekniklerini veya tabak sunumlarını öğrenebilir. Örneğin, AR ile bir tabağı 3D sunumunu görerek, tabağın nasıl düzenleneceğini pratik edebilirler. Erişilebilirliği Artırır Gerçeklik teknolojileri, fiziksel mutfak ortamına erişimi olmayan öğrenciler için büyük bir fırsat sunar. Örneğin, uzaktan eğitim alan bir öğrenci, VR mutfak simülasyonları sayesinde birebir pratik yapabilir veya AR destekli tariflerle yemek pişirme sürecini adım adım takip edebilir. 	<p>4. Hata Yapma ve Öğrenme Sürecini Güçlendirir Gerçek mutfakta yapılan hatalar zaman ve maliyet kaybına yol açabilir. Ancak sanal ortamda hata yapmak güvenlidir. Örneğin, bir öğrenci VR mutfağında yanlış bıçak tekniği uyguladığında, sistem ona geri bildirim verir ve doğru tekniği öğretir. Bu, öğrencilerin öğrenme sürecini hızlandırır.</p> <p>5. Gastronomi Eğitimini Daha Çekici ve Yenilikçi Hale Getirir Günümüz öğrencileri teknolojiyle iç içe büyüyor. Gerçeklik teknolojileri kullanılarak eğitim materyalleri daha interaktif hale getirilebilir. Örneğin, bir öğrenci AR gözlüğü takarak farklı ülkelerin mutfak kültürlerini 3D modellemelerle keşfedebilir, böylece uluslararası mutfak bilgisi daha etkili bir şekilde aktarılabilir.</p> <p>Sonuç olarak, gerçeklik teknolojileri gastronomi eğitimine hem teorik hem de pratik anlamda büyük katkılar sağlar. Hem maliyetleri düşürerek sürdürülebilir bir eğitim sunar hem de öğrencilerin interaktif ve deneyimsel öğrenme süreçlerini destekler.</p> <p>Soru 2: Gerçeklik teknolojileri gastronomi eğitimine nasıl katkı sağlar?</p> <p>Gerçeklik teknolojileri, gastronomi eğitimine beş temel alanda katkı sağlar:</p> <ol style="list-style-type: none"> Uygulamalı Eğitimi Güçlendirme <ul style="list-style-type: none"> Sanal Gerçeklik (VR) Simülasyonları: Öğrenciler, VR mutfak ortamında bıçak tekniklerini, pişirme süreçlerini ve tabak düzenlemeyi deneyimleyebilirler. Örneğin, Michelin yıldızlı bir restoranın mutfağını VR ile ziyaret edip oradaki çalışma sistemini öğrenebilirler. Artırılmış Gerçeklik (AR) Destekli Tarifler: AR gözlükleri veya mobil uygulamalar aracılığıyla, öğrenciler bir tarifi uygularken gerçek zamanlı görsel rehberlik alabilirler. Örneğin, bir tatlının kıvamının nasıl olması gerektiğini AR üzerinden karşılaştırabilirler. Hata Yaparak Öğrenme ve Geri Bildirim Mekanizmaları <ul style="list-style-type: none"> VR simülasyonları, öğrencilerin gerçek mutfak ortamında yapamayacakları denemeleri güvenli gerçekleştirmelerini sağlar. Örneğin, yanlış bıçak kullanımı veya hatalı hijyen uygulamaları VR ile simüle edilerek öğrenciye anında geri bildirim verilebilir. Sesli ve görsel uyarılar sayesinde, öğrenciler hatalarını anında fark edip düzeltebilirler. Örneğin, yanlış pişirme süresi ayarlandığında VR sistemi öğrenciye uyarı verebilir. Maliyetleri ve İsrafı Azaltma <ul style="list-style-type: none"> Gerçek mutfak eğitimi malzeme tüketimi gerektirir ve bu da maliyetleri artırır. VR ve AR teknolojileri sayesinde öğrenciler malzemeleri tüketmeden tarifleri deneyimleyebilirler. Örneğin, AR destekli bir uygulama sayesinde, öğrenciler yemeklerin tabak sunumlarını dijital olarak tasarlayabilir, böylece yiyecek israfı önlenmiş olur. 	<p>4. Eğitimi Daha Erişilebilir ve Esnek Hale Getirme</p> <ul style="list-style-type: none"> Online gastronomi eğitimleri VR ile çok daha etkili hale getirilebilir. Fiziksel mutfaka erişimi olmayan öğrenciler, VR mutfakları sayesinde uygulamalı eğitim alabilirler. Ayrıca, AR destekli tarifler ve rehberler sayesinde, öğrenciler kendi hızlarında öğrenebilir, belirli aşamaları tekrar edebilirler. <p>5. Gastronomi Kültürünü ve Yaratıcılığı Geliştirme</p> <ul style="list-style-type: none"> Sanal Turlar ve Kültürel Deneyimler: Öğrenciler, VR teknolojisiyle farklı ülkelerin mutfaklarına sanal geziler yaparak, Japonya'da bir sushi ustasından veya Fransa'da bir pastacıdan birebir eğitim alabilirler. Yeni Tarif ve Teknik Geliştirme: AR ve VR, öğrencilere farklı malzemeleri ve teknikleri dijital ortamda test etme imkanı sunarak, mutfakta daha yaratıcı olmalarına yardımcı olur. <p>Örnek Senaryo:</p> <p>Bir gastronomi öğrencisi Michelin yıldızlı bir şefin sanal gerçeklikte oluşturulmuş mutfağına girerek onunla birlikte bir yemek pişirebilir. Bu süreçte, artırılmış gerçeklik sayesinde yemeğin pişme derecesini ve sunum tekniklerini görsel olarak analiz edebilir.</p> <p>Sonuç olarak, gerçeklik teknolojileri gastronomi eğitimine uygulamalı öğrenme, hata yaparak öğrenme, maliyet tasarrufu, erişilebilirlik ve yaratıcılık gibi birçok açıdan önemli katkılar sağlar.</p> <p>Soru 3: Gerçeklik teknolojileri kullanılarak gastronomi eğitiminde neler yapılabilir?</p> <p>Gerçeklik teknolojileri kullanılarak gastronomi eğitiminde birçok yenilikçi uygulama hayata geçirilebilir. Bu uygulamalar sanal gerçeklik (VR), artırılmış gerçeklik (AR) ve karma gerçeklik (MR) gibi teknolojilerle desteklenerek eğitimin daha etkili, interaktif ve erişilebilir hale gelmesini sağlar. İşte bu teknolojilerin gastronomi eğitiminde nasıl kullanılabileceğine dair bazı örnekler:</p>

1. Sanal Gerçeklik (VR) ile Etkileşimli Mutfak Simülasyonları

- **Profesyonel Mutfak Ortamında Eğitim:** Öğrenciler, VR gözlükleri kullanarak Michelin yıldızlı bir restoranın mutfağına sanal olarak girebilir ve oradaki işleyişi gözlemleyebilirler.
- **Gerçek Zamanlı Senaryolar:** Örneğin, öğrenciler VR simülasyonlarında bir restoranın yoğun saatlerinde siparişleri nasıl yönetebileceklerini öğrenebilir. Stres altında karar verme yetenekleri geliştirilebilir.
- **Hijyen ve Güvenlik Eğitimleri:** VR ortamında, öğrenciler güvenli bıçak kullanımı, yangın önleme, çapraz bulaşma riskleri gibi konularda uygulamalı eğitim alabilirler.

2. Artırılmış Gerçeklik (AR) ile Görsel Destekli Eğitim

- **Adım Adım Yemek Pişirme Kılavuzları:** AR gözlükleri veya mobil uygulamalar aracılığıyla öğrenciler, bir tarifi uygularken ekranda beliren yönlendirmeleri takip edebilirler.
- **3D Modelleme ile Tabak Sunumu ve Dizayn:** AR teknolojisi ile öğrenciler, bir yemeğin sunumunun nasıl olması gerektiğini sanal olarak görebilir ve aşağıdaki tasarımlarını dijital ortamda deneyerek en iyi sunumu oluşturabilirler.

- **Bileşen ve Malzeme Tanıma:** Öğrenciler, AR destekli bir uygulama ile malzemeleri taratarak besin değerlerini, saklama koşullarını ve alternatif malzemeleri öğrenebilirler.

3. Karma Gerçeklik (MR) ile Uygulamalı ve Deneyimsel Öğrenme

- **Gerçek Zamanlı Eğitim ve Rehberlik:** MR gözlükleri sayesinde bir eğitmen uzaktan bağlanarak öğrencinin yaptığı işlemleri gözlemleyebilir ve gerçek zamanlı geri bildirim verebilir.
- **Sanal Ustalardan Birebir Ders:** Bir öğrenci MR teknolojisi ile dünyaca ünlü bir şefin sanal avatarı ile birlikte yemek yapabilir ve ondan birebir eğitim alabilir.
- **Etkileşimli Menü Tasarımı:** Öğrenciler, MR ile bir restoranın menüsünü 3D olarak deneyimleyebilir, hatta sanal ortamda farklı menü tasarımlarını test edebilirler.

4. Uzaktan Gastronomi Eğitimi

- **Eğitimleri Küresel Hale Getirme:** Fiziksel mutfak imkanı olmayan öğrenciler, VR ve AR destekli mutfak simülasyonları ile uzaktan uygulamalı eğitim alabilirler.
- **Canlı Sanal Atölyeler ve Workshoplar:** Dünyanın farklı yerlerinden şefler, sanal ortamda interaktif atölyeler düzenleyerek öğrencilere birebir eğitim verebilirler.
- **Sanal Kültürel Mutfak Gezileri:** Öğrenciler, VR kullanarak farklı ülkelerin pazarlarını gezebilir, yöresel malzemeleri tanıyabilir ve kültürel mutfak deneyimi yaşayabilirler.

5. Gerçeklik Teknolojileri ile Yaratıcılığı ve İnovasyonu Destekleme

- **Yeni Tarifler Geliştirme:** AI destekli VR mutfakları sayesinde öğrenciler farklı malzemeleri sanal ortamda karıştırarak yeni tarifler oluşturabilirler.
- **Moleküler Gastronomi Deneyleri:** VR simülasyonları ile sıvı azot, köpükme teknikleri veya jelatinleşme gibi ileri seviye gastronomi teknikleri güvenli bir ortamda uygulanabilir.
- **Sürdürülebilirlik Eğitimleri:** AR ile atık yönetimi konusunda interaktif simülasyonlar geliştirilebilir ve öğrenciler atık azaltma stratejilerini öğrenebilirler.

Örnek Senaryo

Bir gastronomi öğrencisi, AR gözlükleri takarak bir tatlının nasıl katmanlı olarak inşa edilmesi gerektiğini 3D görsellerle izleyebilir. Aynı zamanda VR ile Michelin yıldızlı bir restoranda staj yapıyormuş gibi hissedebilir. Öğrenci, MR teknolojisi sayesinde dünyanın farklı noktalarından şeflerle ortak bir mutfak deneyimi yaşayabilir.

Sonuç

Gerçeklik teknolojileri, gastronomi eğitiminde uygulamalı öğretimi destekler, maliyetleri azaltır, erişilebilirliği artırır ve öğrencilerin yaratıcı yeteneklerini geliştirmesine yardımcı olur. Bu teknolojiler, gastronomi eğitiminin geleceğini şekillendirerek hem eğitmenler hem de öğrenciler için devrim niteliğinde yenilikler sunmaktadır.

Soru 4: Gerçeklik teknolojileri gastronomi eğitiminin uygulamalı ve teorik dersleri için nasıl katkı sağlar?

Gerçeklik teknolojileri, gastronomi eğitiminin hem uygulamalı hem de teorik derslerine önemli katkılar sağlar. Bu katkılar, sanal gerçeklik (VR), artırılmış gerçeklik (AR) ve karma gerçeklik (MR) gibi teknolojiler aracılığıyla öğrenme süreçlerini daha etkili, erişilebilir ve interaktif hale getirir.

1. Uygulamalı Dersler İçin Katkıları

Gastronomi eğitimi büyük ölçüde uygulamalı çalışmalara dayalıdır. Gerçeklik teknolojileri, öğrencilerin fiziksel mutfak ortamında karşılaşılabilecekleri deneyimleri sanal ortamda yaşayarak öğrenmelerini sağlar.

a. Sanal Gerçeklik (VR) ile Mutfak Simülasyonları

- **Gerçekçi Mutfak Deneyimi:** Öğrenciler, VR başlıkları kullanarak bir restoran mutfağına sanal olarak girip, farklı tarifleri uygulamalı olarak deneyimleyebilirler.
- **Bıçak Teknikleri Eğitimi:** VR simülasyonları ile öğrenciler, bıçak tutuşu, doğrama teknikleri ve kesme hızını geliştirebilirler. Yanlış bir hareket yaptıklarında sistem geribildirim vererek hatalarını düzeltmelerini sağlar.
- **Zaman Yönetimi ve Stres Yönetimi Eğitimi:** Öğrenciler VR ortamında yoğun bir mutfakta çalışarak siparişleri zamanında hazırlamayı ve mutfak içi koordinasyonu öğrenebilirler.

b. Artırılmış Gerçeklik (AR) ile Gerçek Zamanlı Rehberlik

- **Adım Adım Tarif Uygulamaları:** AR gözlükleri veya mobil uygulamalar, öğrencilerin yemek yaparken tarifleri ve pişirme talimatlarını 3D görsellerle takip etmelerini sağlar.
- **3D Tabak Sunumu Tasarımı:** Öğrenciler, bir tabağı nasıl düzenlenmesi gerektiğini AR üzerinden görebilir ve tabak tasarımını dijital olarak simüle edebilirler.

<ul style="list-style-type: none"> • Yemek Kimyası ve Moleküler Gastronomi: AR teknolojisi ile öğrenciler, malzemelerin kimyasal reaksiyonlarını ve pişirme süreçlerini görsel olarak inceleyebilirler. Örneğin, sıcaklık değişimlerinin çikolata veya hamur üzerindeki etkisini gözlemleyebilirler. <p>c. Karma Gerçeklik (MR) ile Gerçek Zamanlı Geri Bildirim</p> <ul style="list-style-type: none"> • Sanal Şef ile Eğitim: MR gözlükleri ile öğrenciler, ünlü bir şefin dijital avatarı tarafından yönlendirilerek tarifleri adım adım öğrenebilirler. • Hata Analizi ve Düzeltme: MR destekli sistemler, öğrencinin yaptığı hareketleri algılayarak hatalı kesim, yanlış pişirme süresi veya hijyen ihlali gibi durumlarda anında uyarılar verebilir. <hr/> <p>2. Teorik Dersler İçin Katkıları</p> <p>Gastronomi eğitiminin teorik dersleri genellikle beslenme bilimi, gıda güvenliği, gastronomi tarihi, mutfak yönetimi gibi konuları kapsar. Gerçeklik teknolojileri, bu konuları görselleştirerek öğrenme sürecini daha etkili hale getirir.</p> <p>a. VR ile Kültürel ve Tarihî Mutfak Keşfetme</p> <ul style="list-style-type: none"> • Sanal Yemek Kültürleri Gezileri: Öğrenciler, VR gözlükleri kullanarak farklı ülkelerin mutfaklarını gezebilir, yerel pazarları ziyaret edebilir ve yemek kültürleri hakkında bilgi edinebilirler. Örneğin, VR ile Osmanlı mutfakını veya Japon Kaiseki yemek kültürünü keşfedebilirler. • Tarihi Yemeklerin Canlandırılması: VR simülasyonları ile öğrenciler, geçmişte nasıl yemekler pişirildiğini ve bu yemeklerin hangi malzemelerle yapıldığını öğrenebilirler. <p>b. AR ile Gıda Güvenliği ve Beslenme Eğitimi</p> <ul style="list-style-type: none"> • Besin Değerleri Analizi: AR uygulamaları, bir malzemenin üzerine tutulduğunda kalori, protein, yağ ve karbonhidrat değerlerini göstererek beslenme eğitimi interaktif hale getirebilir. • Gıda Hijyeni ve Güvenliği: Öğrenciler, AR destekli simülasyonlarla hijyen kurallarını uygulamalı 	<ul style="list-style-type: none"> • Gıda Hijyeni ve Güvenliği: Öğrenciler, AR destekli simülasyonlarla hijyen kurallarını uygulamalı olarak öğrenebilirler. Örneğin, çapraz bulaşmayı önlemek için hangi malzemelerin hangi kesme tahtalarında hazırlanması gerektiğini görsel olarak inceleyebilirler. <p>c. MR ile Restoran Yönetimi ve Menü Planlama</p> <ul style="list-style-type: none"> • Restoran Simülasyonları: Öğrenciler, MR ile bir restoranın mutfak ve servis alanını sanal olarak tasarlayabilir ve müşteri akışını yönetmeyi öğrenebilirler. • Sanal Menü Testleri: Öğrenciler, MR ile yeni bir menüyü dijital ortamda tasarlayarak, müşteri geri bildirimlerini analiz edebilir ve en iyi menü seçeneklerini belirleyebilirler. <hr/> <p>Örnek Senaryo: Gerçeklik Teknolojileriyle Desteklenen Bir Eğitim Günü</p> <ol style="list-style-type: none"> 1. Teorik Ders: Öğrenciler, VR gözlükleriyle Osmanlı Saray Mutfakına sanal bir gezi yaparak, dönemin yemek pişirme tekniklerini öğrenirler. 2. Uygulamalı Ders: AR destekli bir uygulama ile öğrenciler, bir yemeği pişirirken ekran üzerinde beliren adımları takip ederler. 3. Hijyen Eğitimi: MR gözlükleriyle, mutfakta çapraz bulaşmayı önlemek için hangi bıçak ve kesme tahtasının kullanılacağını öğrenirler. 4. Mutfak Yönetimi: VR ortamında bir restoranın mutfakını yöneterek yoğun saatlerde nasıl organize olacaklarını deneyimlerler. 	<p>Sonuç</p> <p>Gerçeklik teknolojileri, gastronomi eğitiminin hem uygulamalı hem de teorik derslerini daha etkili, interaktif ve erişilebilir hale getirir.</p> <ul style="list-style-type: none"> • Uygulamalı derslerde, öğrenciler VR mutfaklarında pratik yapabilir, AR ile tabak sunumlarını geliştirebilir ve MR ile hata analizi yaparak kendilerini geliştirebilirler. • Teorik derslerde, VR ile kültürel mutfak gezileri yapabilir, AR ile gıda güvenliği eğitimini interaktif hale getirebilir ve MR ile restoran yönetimi simülasyonları oluşturabilirler. <p>Bu sayede, öğrenciler daha güvenli, düşük maliyetli ve yenilikçi bir öğrenme sürecinden geçerek gastronomi alanında daha yetkin hale gelirler. 🚀</p> <div style="background-color: #f0f0f0; padding: 10px; border-radius: 10px; margin-top: 20px;"> <p>Soru 5: Gerçeklik teknolojilerinin gastronomi eğitimine entegre edilmesinin avantajları ve dezavantajları nelerdir?</p> </div> <hr/> <p>Gerçeklik teknolojilerinin gastronomi eğitimine entegrasyonu, öğrenme sürecini daha etkili, erişilebilir ve yenilikçi hale getirir de, bazı zorlukları ve sınırlamaları da beraberinde getirir. Bu nedenle, hem avantajlarını hem de dezavantajlarını detaylı bir şekilde incelemek gerekir.</p> <hr/> <p>✓ Avantajlar</p> <p>1. Uygulamalı Öğrenmeyi Güçlendirme</p> <ul style="list-style-type: none"> • Sanal mutfak deneyimi: Öğrenciler, VR simülasyonları sayesinde mutfak ortamında birebir çalışabilir, kesme, doğrama ve pişirme tekniklerini uygulayarak öğrenebilirler. • Gerçek zamanlı rehberlik: AR destekli tarifler ve teknikler, öğrencilerin yemek yaparken adım adım
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Soru 5: Gerçeklik teknolojilerinin gastronomi eğitimine entegre edilmesinin avantajları ve dezavantajları nelerdir?

Gerçeklik teknolojilerinin gastronomi eğitimine entegrasyonu, öğrenme sürecini daha etkili, erişilebilir ve yenilikçi hale getirir. Ancak, bazı zorlukları ve sınırlamaları da beraberinde getirir. Bu nedenle, hem avantajlarını hem de dezavantajlarını detaylı bir şekilde incelemek gerekir.

✅ Avantajlar

1. Uygulamalı Öğrenmeyi Güçlendirme

- Sanal mutfak deneyimi: Öğrenciler, VR simülasyonları sayesinde mutfak ortamında birebir çalışabilir, kesme, doğrama ve pişirme tekniklerini uygulayarak öğrenebilirler.
- Gerçek zamanlı rehberlik: AR destekli tarifler ve teknikler, öğrencilerin yemek yaparken adım adım yönlendirilmesini sağlar.

2. Maliyetleri ve İsrafı Azaltma

- Malzeme tüketimini minimize etme: Gerçek mutfak ortamında yemek yapmak, malzeme ve ekipman kullanımı gerektirir. VR ve AR teknolojileri, fiziksel malzeme kullanmadan sanal ortamda öğrenmeyi mümkün kılar.
- Hata yapma maliyetini düşürme: Öğrenciler yanlış kesme, pişirme veya tabak düzenleme hatalarını sanal ortamda düzelterek, gerçek mutfakta hatalarını minimize edebilirler.

3. Güvenli Öğrenme Ortamı Sunma

- Yanık, kesik ve diğer mutfak kazalarına karşı koruma: Sanal simülasyonlar, öğrencilerin riskli mutfak işlemlerini güvenli bir şekilde öğrenmesini sağlar.

- Hijyen ve sanitasyon eğitimini destekleme: AR ile bulaşma riskleri, hijyen protokolleri ve mutfak güvenliği gibi konular interaktif şekilde öğretilir.

4. Erişilebilirliği Artırma

- Uzaktan gastronomi eğitimi: Fiziksel bir mutfağa erişimi olmayan öğrenciler, VR mutfak ortamlarında uygulamalı eğitim alabilirler.
- Engelli bireyler için fırsatlar: Hareket kısıtlılığı olan bireyler, sanal mutfak deneyimleriyle gastronomi eğitimine katılabilir.

5. Öğrenci Motivasyonunu ve Yaratıcılığını Artırma

- Etkileşimli ve eğlenceli öğrenme süreci: VR ve AR destekli eğitimler, daha ilgi çekici ve akılda kalıcı bir deneyim sunar.
- Yeni tarif ve sunum deneyimleri: Öğrenciler, AR destekli 3D tabak tasarımı yaparak yaratıcı sunumlar geliştirebilir.

❌ Dezavantajlar

1. Yüksek Maliyet ve Teknik Gereksinimler

- VR/AR cihazlarının maliyeti: Yüksek kaliteli VR başlıkları, AR gözlükleri ve simülasyon yazılımları pahalı olabilir ve her eğitim kurumu bu yatırımı yapamayabilir.
- Güçlü bilgisayar altyapısı gerektirir: VR uygulamalarının çalışması için yüksek performanslı bilgisayarlara ihtiyaç duyulur.

2. Fiziksel Deneyim Eksikliği

- Gerçek duyuusal deneyimlerin eksikliği: VR/AR teknolojileri, görsel ve işitsel öğrenmeyi destekler ancak tat, koku ve dokunma deneyimlerini tam anlamıyla aktaramaz.

- Gerçek mutfak dinamiklerini tam yansıtmama: VR ortamında pişirme süreci deneyimlenebilir, ancak ısı, dokunsal geri bildirim ve gerçek zamanlı mutfak stresi eksik kalabilir.

3. Teknik Sorunlar ve Kullanıcı Deneyimi Zorlukları

- Cihaz kullanımı konusunda eğitim gerektirir: VR ve AR teknolojilerinin etkili kullanımı için, hem öğrencilerin hem de öğretmenlerin önceden teknik eğitim alması gerekir.
- Siber hastalık (motion sickness) riski: VR kullanımı bazı kişilerde baş dönmesi ve mide bulantısına neden olabilir.

4. Geleneksel Öğrenme Yöntemlerinden Uzaklaşma Riski

- Eğitmen-öğrenci etkileşiminin azalması: Sanal simülasyonlar, öğretmenlerin doğrudan müdahale etmesini zorlaştırabilir ve kişisel geri bildirimin önüne geçebilir.
- Gerçek mutfakta çalışmaya yeterince hazırlanmama: Tamamen dijital ortamda eğitim gören öğrenciler, gerçek mutfakta karşılaşabilecekleri fiziksel zorluklara yeterince hazırlıklı olmayabilirler.

📌 Genel Değerlendirme

Kriter	Avantajlar ✅	Dezavantajlar ❌
Eğitim Kalitesi	Etkileşimli ve eğlenceli öğrenme	Fiziksel deneyim eksikliği
Maliyet	Malzeme israfını azaltır	Cihaz ve yazılım maliyeti yüksektir
Güvenlik	Mutfak kazalarını önler	Gerçek ortamda çalışma eksikliği
Erişilebilirlik	Uzaktan eğitim imkânı sunar	Teknik bilgi ve altyapı gerektirir
Yenilik ve Yaratıcılık	Tabak tasarımı ve yeni tarifler için fırsatlar sunar	Geleneksel eğitim yöntemlerinden uzaklaşma riski

📌 Sonuç

Gerçeklik teknolojileri, gastronomi eğitimine birçok yenilik ve kolaylık getirerek uygulamalı öğrenmeyi geliştirme, maliyetleri düşürme ve erişilebilirliği artırma gibi önemli avantajlar sunar. Ancak, yüksek maliyetler, teknik zorluklar ve fiziksel deneyim eksikliği gibi bazı dezavantajlar da bulunmaktadır.

Bu nedenle, gerçeklik teknolojileri geleneksel gastronomi eğitiminin yerine geçmekten ziyade, tamamlayıcı bir araç olarak kullanılmalıdır. Eğitimci ve kurumlar, bu teknolojileri dengeli bir şekilde entegre ederek hem sanal hem de fiziksel eğitimin avantajlarından en iyi şekilde faydalanabilirler. 📌