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‘How Can I Assist You Today?’: A Comparative Analysis of a Humanoid Robot and a Virtual Human Avatar in Human Perception

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Key Words: Human Robot Interaction, Virtual Human, Humanoid Robot, Anthropomorphism, Uncanny Valley Effect

This study investigates human perceptions of intelligent agents by comparing interactions with a humanoid robot, Nao, and a virtual human avatar, Jack. Both agents utilize GPT-3 for response generation, ensuring consistency in cognitive capabilities, allowing the study to focus on the impact of physical versus virtual embodiment on user perceptions. The research specifically examines attributes of Anthropomorphism, Animacy, Likeability, and Perceived Intelligence, with an additional focus on exploring the uncanny valley effect, a phenomenon where entities that closely resemble humans elicit discomfort.

The study involved ten undergraduate students from Sabancı University, who interacted with both Nao and Jack in a controlled experimental setting. The participants were asked to engage in two distinct types of tasks with each agent: casual recommendation seeking and more personal, emotionally charged advice seeking. These tasks were designed to simulate real-life interactions and assess the agents’ abilities to maintain natural, human-like conversations.

The humanoid robot used in the study, Nao, was equipped with the NaoQi software and integrated with the GPT-3 API through a custom script, allowing it to process spoken inputs and generate spoken responses. Jack, the virtual human avatar, also utilized GPT-3 for generating responses, along with advanced speech-to-text, text-to-speech, and lip synchronization technologies to create

realistic interactions. The interactions were audio-based for both agents to maintain consistency. Participants' perceptions were measured using a modified version of the Godspeed Questionnaire Series, focusing on the dimensions of Anthropomorphism, Animacy, Likeability, and Perceived Intelligence. Additionally, structured interviews were conducted to gather qualitative insights into participants' experiences and any potential instances of the uncanny valley effect.

The results from the Godspeed Questionnaire revealed several key findings. For Anthropomorphism, Nao and Jack scored similarly, indicating that both were perceived as moderately human-like, although Nao was slightly favored. Nao's physical embodiment may have contributed to these perceptions, even though Jack's responses were consistent, reflecting slightly higher internal consistency in the questionnaire responses. In terms of Animacy, Nao was perceived as more lively and interactive compared to Jack. However, both agents showed variability in how participants rated their liveliness, with relatively poor internal consistency in the responses. This suggests that while Nao's physical presence might have made it seem more animated, the difference was not substantial. Likeability was where Nao outperformed Jack significantly. Nao was perceived as more likable, which could be attributed to its physical gestures and presence. The physical embodiment appears to have a positive effect on how users perceive the agent's friendliness and pleasantness. Perceived Intelligence also showed Nao slightly ahead of Jack. Participants rated Nao as more competent and knowledgeable, likely due to the added dimension of physical interaction, which might have made the robot seem more capable.

The study found no conclusive evidence of the uncanny valley effect. While some participants reported feeling slightly uneasy with the virtual human avatar, this discomfort did not correspond directly with high levels of anthropomorphism, suggesting that Jack did not cross the threshold into the uncanny valley.

This study highlights the importance of physical embodiment in enhancing the likeability and perceived intelligence of intelligent agents. While virtual avatars can achieve high levels of human-likeness, as seen with Jack, the physical presence of a humanoid robot like Nao appears to significantly influence user perceptions, particularly in terms of likability and perceived intelligence. These findings suggest that designers of intelligent assistants should consider incorporating physical elements and sophisticated interactive behaviors to improve user experience

and acceptance.

A Comprehensive Survey on the Stat-of-the-Art of The Recent Developments of Generative AI and Its Applications in Real-World Scenarios

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Key Words: Generative Ai, AIGC, Generative Adversarial Networks, Transformers, ChatGPT, Artificial Intelligence, LLM, LVM, Diffusion Models, Latent Diffusion Models

The first century witnessed a huge growth in computing power, which enhanced the research development in deep learning. With increasing user numbers in social media and internet based entertainments, the demand for expert systems to analyze these data and keep the user on these sites. The Machine Learning and deep learning fields particularly recorded a jump in research studies regarding the Artificial Intelligence field. Moreover, the innovation of "Transformers Models", diffusion models and generative adversarial networks (GANS) lead to significant improvements in this field.

These developments lead to the birth of the first commercial world wide range users AI in 2022 or ChatGPT by OpenAi. This Large Language Model which initially was a chat bot that takes an input as a text and produces an output in a text form turned the lights on a new area in humanity history, the area of Large Language Models (LLM), Large Visual Models (LVM).

Later on, the progress in the field and the large demand from titan companies like Google, Microsoft, Amazon etc.. lead to increase the development of larger models like GPT-4o, Gemini Advanced, Cluad Opus 3 etc.. The current situation divided the Ai business world into the following layers:

The first Layer or "The foundation models Layer" The second Layer or " Supporting Layer" The

Third Layer or “The Service Layer”

The first layer requires a huge amount of capital reaching tens of billions of dollars that can only be served by the mega companies like OpenAi, Google, Microsoft, Amazon etc.. This layer considers the first building block in any Ai based product. The second layer also requires a significant amount of capital but like the first layer, the objective of this layer is to provide a supporting infrastructure for the first layer and some of the example companies in this area are deep Learning.ai, 2. Weights & Biases (W&B), Hugging Face, Scale AI ect.. While the first and the second layers consider the backbone of any AI infrastructure, the third layer actually connects the user with the model by producing different sorts of outputs and services. These services can target the individual users in their day to day requests or tasks, or can target the specific business needs “enterprise market.

With increasing research papers concerning this field, we observed the need for a practical survey that can be utilized by any one who wants to delve into the world of generative Ai. This paper will provide a practical survey that will cover the current state-of-the-art development in generative Ai field by providing the recent studies movements, most important models, its designs, its real life applications and how the reader can use it in their project.

We want our paper to be a useful resource for any individual regardless of their background. The focus of this paper will be on the practicality and usefulness, accordingly, we’ll analyze the current popular Ai models, and its empowering infrastructure and its applications. Additionally, the possibility to utilize these large models in the following two fields: petroleum engineering and medicine.

A Qualitative Research of Imagery Effect on Learning at Highschool Level

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Key Words: Guided Imagery, PETTLEP Model, Cognitive Processing, Educational Intervention, High School Education

This study explores the efficacy of guided imagery, specifically the PETTLEP (Physical, Environment, Task, Timing, Learning, Emotion, Perspective) model, as a tool to enhance learning outcomes among high school students. The research was conducted with a cohort of 10th and 11th-grade students from a high school in Bahçeşehir, Istanbul, who were randomly assigned to either an experimental group or a control group. Both groups were exposed to an instructional video that detailed the technical functioning and historical evolution of internal combustion engines. However, the experimental group participated in a structured guided imagery intervention based on the PETTLEP model, which was designed to promote mental rehearsal and enhance cognitive processing of the technical material presented.

The methodology focused on qualitative approaches with pre-intervention and post-intervention interviews provided qualitative insights into shifts in students' attitudes and self-efficacy. The results demonstrated that students in the experimental group also reported increased confidence and motivation, aligning with theoretical perspectives that suggest guided imagery enhances both cognitive and affective dimensions of learning.

The findings suggest that the PETTLEP model, with its multidimensional focus on physical, environmental, emotional, and cognitive aspects of learning, may serve as a valuable pedagogical tool in educational settings, particularly for complex and technical subjects. The study highlights the potential of guided imagery to foster positive attitudes toward learning. These results

underscore the need for future research to validate these findings in more diverse educational contexts, explore the long-term effects of guided imagery on knowledge retention, and assess its applicability across a wider range of disciplines.

A real-world application for Machine Learning and Deep Learning in the Petroleum Industry, particularly in drilling Engineering to detect Stuck Pipe Events

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Key Words: Deep Learning, Machine Learning, Petroleum Engineering, Oil and Gas, Stuck Pipe, Artificial Intelligence.

Energy is a fundamental steering tool for our modern globalization. And the big chunks of the energy are "Oil and Gas" which are one of the main fuel sources for our sustainable life. The petroleum industry is one of the important sectors that deals with the "energy" term from finding the initial oil reserve to refining it into useful materials that can be utilized in any part of our life. For that reason, the sector should be taken into consideration, especially nowadays, all the industries are transferring into the fourth industrial revolution. This revolution is mainly driven by the extraordinary growth in computing infrastructure, data processing, data storage, and predictive capabilities. Oil and gas is currently enduring through this digital transformation along with other sectors.

This paper will dive into the world of Artificial Intelligence namely (Machine Learning and Deep Learning) and its use cases in Petroleum Engineering. Our focus will be on the Specific part of Petroleum Engineering which is "Drilling Engineering". How? Well, in Drilling Engineering, there is a huge cost-loss due to some problems that stop the drilling process and cause what petroleum engineers call "Non-Productive Time Events". For instance, Stuck pipe events "happen when the drill pipe gets stuck in the wellbore", kicks "happen when Sudden underground fluid surge which may lead to blowout", and etc. In our proposed paper, we're proposing advanced Deep Learning techniques to detect these events before it occurs by depending on historical data for

previous fields. Regarding the utilized data, we'll use the open source data from Volve Field and UK National Repository Dataset. After developing the models, we'll compare them with state-of-the-art Machine Learning models that are common in the literature. This project will contribute to the recent studies that focus on cost saving, time and human errors in the drilling operations by using Artificial Intelligence in our study namely Deep Learning.

A Systematic Literature Review on the Use of AI-Supported Chatbots in Higher Education

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Key Words: Artificial Intelligence, AI Chatbots, Chatbot Integration, Higher Education, Immediate Feedback

Abstract The integration of AI chatbots in higher education (HE) has emerged as a significant trend, triggered by advancements in artificial intelligence and the increasing demand for personalized learning experiences. AI chatbots are considered to have a potential to transform education because of their wide range of functions in educational contexts, including providing academic support, enhancing learning outcomes, and facilitating self-regulated learning. This on-going literature review aims to synthesize existing research on the use of AI-supported chatbots in HE, employing the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method to ensure a rigorous and transparent analysis. The review focuses on understanding the effectiveness, challenges, and future potential of chatbots in HE context, contributing to the literature on AI in education and aims to discover the answers to the questions of (a) what the primary functions and applications of AI chatbots in HE settings are, (b) how effective AI chatbots in enhancing student engagement and learning outcomes in HE are, (c) what challenges and limitations have been identified in the implementation of AI chatbots in HE, (d) what the

perceptions and attitudes of students and faculty towards the use of AI chatbots in HE are, (e) how AI chatbots compare to traditional methods of student support and engagement in HE, and (f) what future trends and potential developments are emerging in the use of AI chatbots in HE.

Introduction / Background The integration of artificial intelligence (AI) in higher education (HE) has become increasingly widespread, particularly using AI-supported chatbots. One of the primary uses of AI chatbots in higher education is to assist students in their academic pursuits. Research indicates that students express a strong desire for the integration of AI chatbots, anticipating positive impacts on their educational development (Tian, 2024). These chatbots can provide personalized educational recommendations, thereby fostering lifelong learning and self-study through digital technology (Kingchang, Chatwattana, & Wannapiroon, 2024). Chatbots can also act as conversational partners, enabling students to practice language skills in a supportive environment, which is particularly beneficial for language learners (Hoang, Han & Le, 2023). The ability of chatbots to offer immediate feedback and assistance aligns with the needs of modern learners who seek efficient and effective educational tools (Wu & Yu, 2023).

Moreover, recent research has shown that AI chatbots can improve learning outcomes by acting as mentors and partners in the educational process, facilitate adaptive learning experiences, in which the chatbot tailors its responses based on the individual needs of the student, and therefore, enhance engagement and motivation (Parsakia, 2023). This adaptability is crucial in addressing the diverse learning styles and preferences of students in higher education (Chang, et al., 2023). In addition, studies have stressed the potential of chatbots to support critical thinking and problem-solving skills, which are essential 21st century competencies (Parsakia, 2023; McGrath, Farazouli & Cerratto-Pargman, 2024).

However, the implementation of AI chatbots in HE also poses challenges. Concerns have been raised regarding the accuracy of the information provided by these chatbots, as their responses are dependent on the datasets used for training (Tjahyana, 2024). This limitation necessitates rigorous training and evaluation processes to ensure that the chatbots deliver reliable and relevant information (Tjahyana, 2024; Pernaa et al., 2023). Furthermore, the hype surrounding AI chatbots may lead to unrealistic expectations among educators and students, potentially overshadowing the need for critical engagement with these technologies (Pargman, et al., 2024;

Dempere et al., 2023).

Significance of the study Higher education (HE) is witnessing a dramatic change in the way it provides support, engages students, and handles administrative work with the introduction of AI-powered chatbots. It is imperative that educators, administrators, and politicians comprehend the efficacy, obstacles, and prospects of these technologies in the future as they become increasingly common. To give a thorough knowledge of the influence of AI chatbots in higher education, this systematic literature review attempts to summarise the body of research already done on the subject. In summary, the significance of this literature review lies in its potential to (a) improve student learning and engagement; (b) guide educational practice; (c) solve implementation challenges; (d) influence future research and development; and (e) contribute to the literature on AI in education.

Methodology The continuing literature review follows the PRISMA methodology. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method is a widely recognized framework designed to enhance the transparency and completeness of reporting in systematic reviews and meta-analyses. The PRISMA statement includes a 27-item checklist and a four-phase flow diagram that collectively guide authors in presenting their systematic reviews in a clear and structured manner (Liberati et al., 2009), and involves a structured approach to identifying, selecting, and analyzing relevant studies. The on-going process began with a comprehensive search of academic databases, including Scopus, Web of Science, and Google Scholar, using keywords such as “chatbots in higher education”, ”AI chatbots in higher education”, ”the use of chatbots in higher education”, and ”AI in education.” For example, the initial search with the key words “chatbots” and “higher education” on https://www.scopus.com/ yielded 395 articles, which are currently being screened for relevance based on title and abstract. The same process are being followed to search for relevant articles on the other academic data bases. After removing duplicates and irrelevant studies, the remaining articles will be selected for full-text review. The final selection will include the studies that met the inclusion criteria, which focused on empirical research, the use of AI chatbots in higher education, and the analysis of outcomes related to student learning and institutional efficiency.

Adaptive Learning Systems as one of the modern educational technologies

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Key Words: Adaptive Learning System, Adaptation Algorithm, Machine Learning

The transition to new forms of learning, such as distance learning, requires the development of a more reliable e-learning system. A modern trend in the field of e-learning systems is Adaptive Learning Systems (ALS). The main feature of these systems is adaptation at the level of planning the educational process, adaptation at the level of content of educational material or adaptation at the level of knowledge control. The goal here is to optimize the educational process by building the training in a more suitable form for the student, and at the same time to adapt it to the needs and individual characteristics of the students depending on the analysis of the training results, as well as to provide flexible technologies that allow for personalization and the improvement of its quality, which is considered one of the modern trends of education.

The concept of an ALS is based on principles such as individualization, periodicity of training, completeness, relevance, motivation and elimination of gaps in initial knowledge. The research is devoted to the creation of an adaptation model, which is a mechanism for making decisions in the ALS, and to the study of student behavior based on the data obtained during the teaching of the subject ”Computer technologies and programming” in the engineering specialties of UNEC. In the work, the structure and features of the main components of the subject area, consisting of the user model, the adaptation model, and the learning outcome evaluation model, were studied; An adaptation model was built based on the methods of the Decision Trees class, which allows solving many problems of machine learning in the Python programming language with high accuracy; In order to adapt to the individual educational needs of each participant, the trajectory

of the training process in the experimental group of 30 people was followed and the values of the necessary attributes were analyzed.

As a result of calculating the recommended metrics - entropy, information growth and information gain ratio in the ID3 algorithm applied in the construction of the decision tree, it was possible to make a decision whether any student should transfer to the next course or not, as well as to modify the system according to the changes in students' learning and needs at each stage of training. To evaluate the efficiency achieved when mastering the subject, at the beginning and at the end of testing, a comparative analysis was carried out according to the Mann - Whitney criterion in the case of alfa=0.05: the level of mastery of the same subject was estimated between the groups where traditional training and adaptive training were conducted, respectively. The hypotheses H0 = The distribution of scores in both groups is the same and H1 = The distribution of scores in the experimental group is high were tested. At the initial stage of training, there were no significant differences between the levels of subject proficiency of students from traditional and experimental groups. Analysis of the final results confirmed that the training results in the experimental group were high.

The research on the development and analysis of the decision mechanism of the ALS will allow to solve the issues in the future in the direction of achieving the application of the adaptive education model within the framework of the unified assessment criteria in the Azerbaijani educational environment and the development of software that will be created based on the data that studies the individualized trajectory of the student.

AI-Driven Innovations in Educational Escape Rooms: A Review of Their Potential for Enhancing Learning Experiences

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Key Words: Digital escape room games, artificial intelligence, educational technology

The introduction of artificial intelligence (AI) into educational practices has greatly revolutionized conventional teaching and learning approaches. This analysis specifically examines the production and possible effects of AI-enhanced educational digital escape room games on the academic performance and motivation of students. Immersive and interactive problem-solving settings, known as digital escape rooms, are now widely acknowledged as highly effective educational instruments. When integrated with artificial intelligence, these games provide customized learning experiences, adaptable feedback, and dynamic difficulty modifications, rendering them very attractive for educational purposes. A comprehensive analysis of the existing research on artificial intelligence (AI) implementations in educational game design, focusing specifically on digital escape rooms. The paper examines how artificial intelligence (AI) technology might augment the educational content of these games by customizing material to suit the specific requirements of each student and provide immediate feedback. Furthermore, the review assesses the capacity of AI-powered escape rooms to inspire students, cultivate a more profound comprehension of academic material, and facilitate the growth of critical thinking and problem-solving abilities. The findings indicate that digital escape rooms supplemented with artificial intelligence have significant potential for enhancing educational results. Nevertheless, the assessment also emphasizes certain difficulties and constraints, such as the necessity for meticulous planning to guarantee educational pertinence and the possibility of inequitable availability of technology. Proposed future research directions include the necessity for empirical investigations to verify the efficacy of these tools and the investigation of optimal methods for their incorporation into different educational settings.

Akıllı Telefon Sensör Verileri Kullanılarak Yapay Zekâ Tabanlı İnsan Aktivitesi Tanıma

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Key Words: Akıllı Telefon Sensör Verileri, Fitness ve Sağlık İzleme, İnsan Aktivitesi Tanıma (HAR), Makine Öğrenimi, Yapay Zeka

1. Giriş: Bu çalışma, akıllı telefon sensör verileri kullanılarak insan aktivite tanıma kapasitesini ve makine kullanımını tespit eden modeller üzerine yapılan araştırmayı özetlemektedir. İnsan aktivitesini tanıma (HAR), sağlık takibi, fitness takibi ve akıllı ev sistemleri gibi birçok alanda kritik bir rol oynar. İvmeölçer ve jiroskop gibi sensörlerle donatılmış akıllı telefonlar, farklı insan aktivitelerini tanımak için kullanılan verileri toplamak yerine yanlış verileri toplayabilir ve herhangi bir değişikliğe izin vermeyebilir [1-5]. Bu çalışmanın temel amacı, Yapay Zeka yöntemlerinden Makine Öğrenme yöntemleri ile bu verileri işleyerek en optimize aktivite tespitini sağlamaktır.

2. Araştırma Metodolojisi: Çalışmada kullanılan veri seti [6], 30 kişilik altı farklı aktiviteyi (yürüme, oturma, ayakta durma, yatma, merdiven inme ve merdiven çıkma) içerirken, bel hizalarına yerleştirilen bir akıllı telefon aracılığıyla toplanmıştır. Telefon sensörlerinden elde edilen veriler işlenmiş ve okumak için etiketlenmiştir.

Veri Ön İşleme:

1. Normalizasyon: Ham sensör verileri, modelin eğitim sürecinde sapma yaşamaması için normalleştirilmiştir.

2. Özellik Çıkarımı: Zaman ve frekans özellikleri (sinyal büyüklüğü, enerji, ortalama ve standart

sapmalar gibi ölçümler) sensör verilerinden çıkarılmıştır.

3. Veri Bölme: Veriler, %80 eğitim ve %20 test olmak üzere kullanılmıştır

Makine Öğrenimi Modeli: Bu çalışmada Makine Öğrenmesi yöntemlerinden Rastgele Orman Sınıflandırıcısı (Rastgele Orman) yöntemi seçilmiştir. Bu model, sensörlerdeki gürültüyü yönetme yeteneği ve karmaşık veri setlerini işleme kapasitesi nedeniyle tercih edilmiştir. Rastgele Orman, birden fazla karar ağacı üretir ve sonuçları birleştirerek daha doğru tahminler yapar.

Uygulama: Tüm model eğitim ve test süreci, Python kullanılarak Kaggle platformunda Jupyter Notebook üzerinde gerçekleştirilmiştir. Model inşası, eğitim ve değerlendirme için Scikit-learn kütüphanesi kullanılmıştır.

3. Bulgular: Rastgele Orman modelinin uygulama sonucu %92 doğruluk oranıdır. Sonuç olarak, insan aktivitelerinin akıllı telefon sensörlü sistem bazlı olarak etkin bir şekilde sınıflandırılabileceğini göstermektedir. Rastgele Orman programı, yüksek boyutlu veri işleyebilme kapasitesi sayesinde başarılı sonuçlar verir. Zaman ve frekans harcamaları çıkarımı, modelin doğruluğu ölçüsünde önemli oranda artırılmıştır. Normalleştirilmiş veri ve ön işleme adımları, modelleme sürecinin dengelenmesiyle birleştirilmiş bir performans sağlanmıştır.

Model Performansı: • Doğruluk: %92 • Hassasiyet ve Duyarlılık: Çoğu aktivite için hassasiyet ve bulma skorları %90'ın üzerindedir. Merdiven çıkma ve içerideki aktivitelerde sensör okumalarındaki küçük farklar nedeniyle bazı eksiklikler gözlenmiştir.

4. Uygulama Alanları: Bu çalışmanın günlük hayatta gerçekleştirilebileceği uygulama alanları şunlardır: • Sağlık İzleme: Kronikleşmenin yönetimini içerir. • Fitness Uygulamaları: Daha doğru aktiviteyi tanımak için kişiye özel egzersiz programları içerir. • Akıllı Ev Sistemleri: Kullanıcıların fiziksel parametrelerine göre otomasyon sonuçlarının iyileştirilmesi.

5. Sonuç: Bu çalışma, Makine Öğrenme modellerinin, akıllı telefon sensörlü yapıya dayalı olarak insan aktivitelerini yüksek doğruluk oranlarıyla tanımlayabildiğini göstermektedir. Bu tür modellerin sağlık izleme ve günlük aktivite takibi gibi gerçek dünya uygulamaları mevcuttur. Gelecekteki araştırmalarda, farklı Yapay Zeka yöntemleri kullanılarak ve daha karmaşık özellikler içeren veri setleriyle sonuçlar daha da iyileştirebilir. Aynı zamanda daha karmaşık

insan faaliyetlerinin kaydedilmesi ve gerçek zamanlı aktivite tanıma analizlerinin yapılması gibi alanlarda yapılan ileri çalışmalar için sağlam bir temel oluşturur.

Anatomica: An Augmented Reality Anatomy Book

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Key Words: Augmented Reality, Immersive Technology, Anatomy learning, AR learning, Immersivelearning

The immersive technology transforms passive reading into an engaging, hands-on educational experience. It has a capability that allows students to explore detailed models, view cross-sections, and understand spatial relationships in ways traditional books can't offer. Anatomica is an innovative Augmented Reality (AR) application designed to revolutionize anatomy education. By using AR technology, Anatomica provides an immersive and interactive learning experience, enabling users to explore detailed 3D models of human organs. This paper details the implementation of Anatomica, focusing on the development process, user interaction features, and technical challenges encountered and overcome during the project.

Artırılmış Gerçeklik Destekli Fen Öğrenimine Yönelik Ortaokul Öğrencilerinin Tutumları ve Görüşleri

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Key Words: Artırılmış gerçeklik, fen bilimleri, tutum

Fen eğitiminde teknolojinin kullanımı giderek önem kazanmakta olup bu teknolojilerden biri de artırılmış gerçekliktir. Artırılmış gerçeklik, fiziksel dünyaya sanal unsurların entegre edilmesiyle oluşan bir deneyim sunarak, kullanıcıların gerçeklik algısını zenginleştiren bir teknoloji olarak tanımlanır (Azuma, 2001). Milgram ve Kishino (1994), AG'yi sanal nesnelerin gerçek dünya ile entegrasyonu olarak sınıflandırmıştır. Eğitim bağlamında AG'nin kullanımında, motivasyon, öğrenme performansı, dikkat ve işbirlikçi öğrenme gibi unsurları olumlu yönde etkileyerek öğrencilerin öğrenme süreçlerine katkı sağladığı çeşitli araştırmalarla ortaya konmuştur (Wang et al., 2014; Ibáñez et al., 2014; Chen & Wang, 2015). Bu çalışmanın amacı artırılmış gerçeklik destekli fen öğrenimine yönelik ortaokul öğrencilerinin tutumlarını ve görüşlerini ortaya çıkarmaktır.

Bu araştırmada betimsel tarama modeli kullanılmıştır. Araştırmanın örneklemi Erzurum ili Yakutiye ilçesinde bulunan bir devlet okulundaki 42 ortaokul beşinci sınıf öğrencisinden (20 kız ve 22 erkek) oluşmaktadır. Araştırma kapsamında, fen bilgisi derslerinde 2 ders saati boyunca öğrenciler işbirlikçi öğrenme modeline dayalı olarak AG uygulamalarını kullanmıştır.

Ders sürecinde öğrencilere artırılmış gerçeklik materyallerini kullanabilmeleri için tabletler dağıtılmış ve öğrenciler dört kişilik gruplara ayrılmıştır. İlk aşamada, öğrenciler BlippAR AG uygulaması aracılığıyla hazırlanan ders materyalini kullanmıştır. Materyalin ilk sahnesinde, öğrencilere konu ile ilgili derinleştirme soruları sorulmuş ve sorgulayıcı düşünme becerileri desteklenmiştir. İkinci sahnede, öğrendiklerini test edebilmeleri için Quizizz uygulaması kullanılarak etkileşimli bir yarışma düzenlenmiş, öğrencilerin kendi grupları içinde tartışarak soruları çözmeleri sağlanmıştır. Ayrıca, grup çalışması ile işbirliği ve grup etkileşimi teşvik edilmiştir. Yarışma sonrasında sınıfça sorular tartışılarak geri bildirim verilmiştir. Üçüncü sahnede ise öğrenciler, konu ile ilgili bir YouTube videosu izlemiştir. Dersin sonunda Quiver uygulaması ile bütünleşik bir etkinlik gerçekleştirilmiş ve öğrenciler, biyolojik çeşitlilik ile ilgili resimleri boyayıp bu resimleri Quiver uygulaması ile artırılmış gerçeklik ortamında canlandırmıştır.

Ders sonunda, veri toplama aracı olarak Küçük vd. (2014) tarafından geliştirilen 5'li Likert türünde Artırılmış Gerçeklik Uygulamaları Tutum Ölçeği (AGUTÖ) uygulanmıştır. Elde edilen sonuçlara göre, öğrencilerin artırılmış gerçeklik destekli fen öğrenimine yönelik genel tutumlarının yüksek düzeyde olduğu ortaya çıkmıştır ($\overline{X} = 4.23$, $SS = 0.93$). Ölçeğin alt boyutları incelendiğinde, öğrencilerinin kullanma memnuniyetlerinin ($\overline{X} = 4.12$, $SS = 0.99$) ve kullanma niyetlerinin ($\overline{X} = 4.38$, $SS = 1.10$) yüksek düzeyde olduğu, kullanma kaygılarının ($\overline{X} = 1.80$, $SS = 0.96$) ise düşük düzeyde olduğu ortaya çıkmıştır. Açık uçlu sorulara verilen yanıtların analizi sonucunda, öğrencilerin %69'unun AG uygulamasının kullanımını kolay bulduğu, ancak bazı öğrencilerin uygulama esnasında zorluklar yaşadığı tespit edilmiştir. Bu zorluklar genellikle tablet kullanımı ve ekran yönetimi ile ilgili olmuştur. AG uygulamasının fen derslerinde öğrenmeyi desteklediği ve özellikle biyolojik çeşitlilik konusunun anlaşılmasına katkı sağladığı görülmüştür. Öğrencilerin çoğu, AG uygulamalarının diğer derslerde de kullanılması gerektiğini ifade etmiş ve içerik çeşitliliği talep etmiştir. Bu bulgular, AG'nin derslerde memnuniyet, ilgi ve motivasyonu artırdığını, öğrencilerin kaygılarını azalttığını göstermektedir.

Sonuç olarak, artırılmış gerçeklik destekli fen eğitimi öğrenciler arasında olumlu bir deneyim olarak değerlendirilmiş ve geniş kabul görmüştür. Ancak, uygulama sırasında bazı teknik sorunlar da yaşanmıştır. Bu tür uygulamaların eğitimde yaygınlaştırılabilmesi için uygun teknolojik altyapının sağlanması ve kazanımlara uygun materyallerin tasarlanarak kullanıma sunulması önerilmektedir.

Assessing Usability of Perplexity AI through Expert Heuristics

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Key Words: Usability, Perplexity, Generative AI in research, Expert Heuristics, ai powered research

For the modern era of digital education and academia, AI-powered research applications, from literature review tools to intelligent research companions like Perplexity AI, empower researchers by streamlining workflows, accelerating discovery, and fostering deeper analysis and they as a pivotal force in transforming "searching" and "decision-making". They are viewed as cognitive facilitators, fostering critical thinking, reflection, creativity, and problem-solving skills. While many studies acknowledge the disruptive potential of LLMs, exemplified by their recent foray into automated article generation for major publications (Longoni et.al., 2022; Mariani & Dwived, 2024) and some of them highlight the difficulty of differentiating human-authored and AI-generated research abstracts raise concerns about potential misuse and the blurring of authorship boundaries (Turnitin, 2023; Ma et al., 2023), some studies posit that LLMs are not solely a source of disruption and AI's capacity to enhance predictive models and facilitate data analysis across disciplines offers significant opportunities for research advancement (Else,2023). Additionally, they are believed to accelerate concept acquisition (Vasconcelos & dos Santos, 2023; Owan et al., 2023). However, usability is an important parameter for realizing the developments promised

by these tools. The objective of this research is to assess the utility of the Perplexity AI tool in terms of Nielsen Heuristics. The objective is to provide a framework for the developers of this and similar AI-supported tools to enhance the user experience. So, this study explores how EdTech experts perceive and interact with "Perplexity," an AI application designed for research tasks. Utilizing Nielsen's usability heuristics, the research investigates the application's effectiveness, efficiency, and user satisfaction from the experts' perspective. A mixed method approach gathers both quantitative and qualitative data. Quantitative data includes pre-test surveys assessing demographics, professional background, and AI familiarity, task-based usability testing, and post-test surveys measuring satisfaction and perceived usability. The NASA TLX scale provides additional quantitative data on cognitive load. Qualitative data is obtained through expert interviews, allowing for an in-depth exploration of user experiences and challenges. This comprehensive approach aims to provide valuable insights for optimizing and improving Perplexity for future iterations. The findings of the study point out the importance of the educational technology experts' perspective on usability and AI-powered research applications.

Automatic Speech Recognition for Kyrgyz Language

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Key Words: ASR, Kyrgyz language, Fine-tune model

This article explores the application of Automatic Speech Recognition (ASR) for the Kyrgyz language, focusing on the utilization of the Whisper pre-trained model. Despite significant advancements in ASR technology globally, many languages, including Kyrgyz, lack dedicated systems. Leveraging the capabilities of the Whisper model, we present the methodology for adapting and fine-tuning it to accommodate the unique phonetic nuances of the Kyrgyz language.

Our study highlights the crucial role of ASR technology in linguistic accessibility, particularly in voice-to-text conversion for the Kyrgyz language. We discuss the process of adapting the Whisper pre-trained model to Kyrgyz, emphasizing its potential contributions to language preservation and accessibility.

We outline the methodology employed in adapting and fine-tuning the Whisper pre-trained model for Kyrgyz, addressing challenges such as data scarcity and linguistic nuances. Our approach emphasizes the importance of leveraging existing resources to enhance linguistic accessibility. Our research demonstrates the positive impact of the adapted ASR model on education, content creation, and language preservation within the Kyrgyz community. By enabling voice-to-text conversion in Kyrgyz, the trained model facilitates communication and access to information in the native language.

The importance of developing digital resources for the Kyrgyz language cannot be overstated. With the rapid advancement of technology and the increasing reliance on digital platforms, it is crucial to ensure that minority languages like Kyrgyz are not left behind. The adapted Whisper

ASR model represents a significant step towards bridging the digital divide and promoting linguistic diversity in the digital realm.

By enabling voice-to-text conversion in Kyrgyz, the trained model opens up new opportunities for content creation, education, and cultural preservation. It empowers the Kyrgyz community to produce and consume digital content in their native language, fostering a sense of pride and ownership over their linguistic heritage. Furthermore, the availability of ASR technology for the Kyrgyz language facilitates accessibility for individuals with disabilities, enabling them to engage with digital content through voice commands and transcriptions.

In the realm of education, the adapted ASR model can revolutionize language learning and teaching processes. It can be integrated into educational platforms and applications, providing language learners with an immersive and interactive experience. Additionally, it can assist in the digitization and preservation of oral traditions, cultural narratives, and historical accounts, ensuring that the rich tapestry of Kyrgyz culture is not lost to future generations.

In conclusion, this article underscores the transformative impact of ASR technology on the visibility of the Kyrgyz language, with Whisper playing a pivotal role in bridging technology and linguistics. Our research contributes to the ongoing discourse on linguistic diversity, digital inclusivity, and the symbiotic relationship between technology and language preservation. By adapting the Whisper pre-trained model to the Kyrgyz language, we not only enhance linguistic accessibility but also pave the way for the digital empowerment of the Kyrgyz community, ensuring that their language and culture thrive in the digital age.

Çevrimiçi Profesyonel Gelişim Eğitim Katılımcılarının Program Tercihleri

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Key Words: KAÇD, Profesyonel Gelişim, e-Öğrenme, Birliktelik Kuralı

Profesyonel gelişim bireyin mevcut görevlerini yerini getirme ve kariyerinde ilerleme kaydedebilmesi için ihtiyaç duyduğu; bilgi, beceri ve deneyime yönelik içerik ve süreçler olarak tanımlanmaktadır. (Harris ve Ramos, 2013). Mackay (2017) ise profesyonel gelişimi iş ve hizmet üretim süreçlerinin sürdürülebilirliği ve niteliğin arttırılabilmesi için bir beşerî sermaye yatırımı olarak nitelendirmektedir. Yalnızca iş verenler değil çalışanların da profesyonel gelişime yönelik eğitimler almak için bazı gerekçeleri bulunmaktadır. Örneğin, birçok çalışan kendi profesyonel gelişimini sürdürmek, mesleki tatmin ve daha iyi iş imkanlarına sahip olabilmek amacıyla eğitimler almaktadır (Coffiel, 1999; Volles, 2014). Bu nedenle birçok genç de iş başvurusu yaparken (Öte yandan bugün birçok yetişkin eğitim hayatı 18-25 yaşını kapsayan bir dönemde sonlandırarak iş hayatına geçiş yapmıştır. Ancak dijital dönüşümün bu denli hızla gerçekleştiği günümüz için bir iş koluna yönelik yetkinlik ve yeterlik tanımları da farklılaşmaktadır. Ek olarak Dünya Ekonomik Forumu (World Economic Forum, WEF, 2018) yapay zekanın da etkisiyle bugün mevcut mesleklerin büyük bir çoğunluğunun 2020'li yılların ilk yarısında varlığını koruyamayıp bugün henüz deneyimlenmemiş mesleklerin ise ortaya çıkacağını öngörmektedir. Bu nedenle

Birleşmiş Milletlerin (2016) Sürdürülebilir Kalkınma Amaçları (Sustainable Development Goals, SDG) yer alan 17 amaçtan birisi olan "Nitelikli Eğitim"dir. Bu kapsam tüm fertlerin nitelikli eğitime erişim imkanlarına sahip olmasını ve yaşam boyu öğrenmeye katılımlarını desteklenmesine yönelik adımlar atılması hedeflenmektedir (BM, 2016). Dolayısıyla profesyonel gelişim faaliyetleri yalnızca sektörel veya bireysel bir gereksinim olarak değil küresel ölçekte sürdürülebilir kalkınmanın da anahtarıdır. Bununla birlikte profesyonel gelişim sürecinin günümüz iş-yaşam dengesi göz önünde bulundurulduğunda yeniden planlanmasına ihtiyaç duyulmaktadır (ILO, 2010). Bu ihtiyaça yönelik olarak bireysel olarak profesonel gelişimini sürdürmek isteyenlerin genellikle kitlesel çevrimiçi açık ders (KAÇD) platformlardan yararlanma yolunu tercih etme eğilimi gösterdiği görülmektedir (Karnouskos, 2017). Katılımcıları için ön koşul beklenmediği KAÇD'lerde ders içeriğini ve tüm öğrenme etkinliklerini tamamlanması halinde sertifika almaya hak kazanılmaktadır (Loeckx, 2016). Günceel istatistikler bugün birçok KAÇD platformun kayıtlı öğrenen sayısının milyonlarla ifade edildiğini göstermektedir (Coursera, 2020). Dolayısıyla bu platformalara yönelik yoğun bir ilgi söz konusu olduğu görülmektedir. Bu ilginin devamlılığı açısından nitelikli ve ihtiyaca yönelik içerik geliştirilmesi önemli bir gereklilik haline gelmiştir. Bu noktada KAÇD'lerde eğitimi tamamlamış öğrenenlerin verileri önemli ipuçları taşımaktadır. Araştırma kapsamında kullanıcıların tamamladıkları sertifika programları arasındaki ilişki birliktelik kuralı analiziyle incelenerek öğrenenlerin hangi eğitimleri beraber tamamlama eğiliöminde olduğu ortaya konulacaktır. Böylece öğrenenlere yeni sertifika programları önerileri sunulabileceği gibi başta KAÇD'ler olmak üzere e-öğrenme platfofmları için içerik geliştiriceler için gleceğe yönelik bir projeksiyon sunulabilecektir.

Classification of Muscle Activity Patterns in Treadmill Walking Using sEMG and Kinematic Data

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Key Words: EMG, Gait, Classification, SVM

Numerous studies have focused on gait and electromyography (EMG) measurements to better understand human locomotion. These studies have utilized both ground and treadmill walking conditions. While treadmills limit the walking space, they provide controlled data by regulating the subject's walking speed. Despite their limitations, treadmills have been widely used in research for this reason. The present study aims to analyze the gait and muscle activity of 10 healthy subjects walking on a treadmill at speeds ranging from 0.8 m/s to 2 m/s with increments of 0.1 m/s.

Methodically, the data will be acquired in a uniform fashion therefore 50 heel strikes will be recorded from each leg during the experiment. Ten muscles on both sides of the body are monitored, including the tibialis anterior, gastrocnemius medialis, biceps femoris, vastus medialis, and soleus. EMG signals recorded at different speeds are analysed to categorize each speed by the machine learning algorithms in order to assign it to the correct speed group. Speed variations play an important role in designing rehabilitation protocols. Classification analysis was applied to identify a specific gait speed based on the EMG data.

The results proved high accuracy in identifying the specific speed that has been performed. Feature based and time based analysis are two main distinct approaches in the machine learning field for acquiring classification accuracies. In comparison with other models processed, the highest accuracy percentage in the time based analysis was shown to be in Supervised Machine Learning (SVM) algorithm which is 81%±2. The accuracy is calculated as 63±3 with the feature

based method. This high accuracy learning algorithm in this research will provide authentic applications in the biomedical world. This will also implement using these accuracies with specific muscle activity patterns for precise gait analysis. It will not only be used for classification but will also play significant role in human-computer interaction (HCI).

Human-computer interaction can present several approaches in the biomedical field. One of the interactions is for rehabilitation purposes. The results of this research can be used in the design and operation of assistive devices. Prosthetics and exoskeletons can be controlled by the patient's muscular contractions. The classification method will also help improve the biofeedback systems in several fields such as sports and therapy. Abnormal activations of the muscles will be detected by the clinical diagnostic decision algorithms thereby decreasing the chance of injuries. In the biomedical and human-interaction field, the integration of the EMG signal classification will further improve the future of rehabilitation, prosthetics, and assistive devices. It will also develop and provide faster adaptation to devices that respond in real-time therefore developing protocol designs applied in clinics in the near future.

Decoding the Uncanny Valley: Investigation of Factors Causing the Phenomenon

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Key Words: uncanny valley, AI-generated characters, human-computer interaction, emotional response, voice-over

The concept of the ”uncanny valley,” proposed by Masahiro Mori in 1970, describes the discomfort experienced by humans when encountering entities that closely resemble humans but are not quite fully human-like. This article investigates this phenomenon from the perspective of human computer interaction, especially focuses on college-level students' attitudes about artificially characters. This paper investigates the influence of levels of realism on emotional and perceptual responses in digital faces, offering insight into which properties may be most important.

50 participants, aged 18 to 30 with equal gender distribution, were recruited to engage with a series of videos featuring AI-generated characters. These videos varied in their levels of human-likeness, ranging from simple avatars with robotic voices to more complex humanoid robots and hyper-realistic human simulations. The participants' responses were assessed through detailed questionnaires designed to capture their perceptions of realism, emotional responses, and discomfort levels. The study employs both quantitative and qualitative methodologies to evaluate the impact of each factor which are blinking rates, facial expressions, head and hand movements, voice synchronization and intonation on the perception of realism and the uncanny valley effect.

The results indicate that while AI-generated characters with more human-like features generally receive more favorable responses, certain elements, like unnatural blinking or mismatched voice and facial expressions, can significantly heighten discomfort and reduce perceived trustworthiness

and sympathy. The findings suggest that to reduce the uncanny valley effect and enhance user acceptance, designers of AI-generated characters should aim for a careful balance of human-like features that don't verge into the uncanny. Key elements such as natural blinking patterns, consistent synchronization between voice and facial movements, and genuine facial expressions are essential for increasing user comfort and emotional engagement.

Through an in-depth analysis of the data gathered, it was found that the feature most significantly contributing to the uncanny valley effect was the blinking rate of the AI-generated characters. Characters with unnatural or inconsistent blinking patterns elicited notably higher levels of discomfort and unease among participants compared to those with natural, human-like blinking rates. The study indicates that while many elements contribute to the perception of realism and discomfort, blinking rate stands out as a crucial factor influencing the uncanny valley effect. Characters that displayed erratic or excessively slow blinking were often perceived as less lifelike and more unsettling, underscoring the importance of this seemingly minor yet critical feature in digital character design.

In conclusion, the findings shed light on the significant effects of psychological constructs in designing and effectively realizing AI-driven characters or humanoid robots. This work addresses human factors that lead to the uncanny valley and as a result, is anticipated to contribute towards development of better-designed state-of-the-art user interfaces being both technologically adept while emotionally appealing. Our findings underscore the importance of scrutinizing particular aspects of human-like appearance in AI-generated characters—specifically, blink rates—to prevent an uncanny valley response. Designers of artificial characters should prioritize achieving naturalistic blinking patterns and ensure that other features such as facial expressions, voice synchronization, and movement patterns are harmonized to create a more believable and comfortable user experience. By addressing these elements thoughtfully, it is possible to enhance user acceptance and engagement, ultimately leading to more effective and relatable digital interactions.

Design, Development, and Usability of Collaborative Virtual Reality Environments

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Key Words: Virtual Reality, Multi-user Interaction, Human Computer Interaction

Human-Computer Interaction (HCI) technologies, particularly Virtual Reality (VR), are becoming increasingly prevalent, making it essential to uphold high usability standards as these technologies advance. This project investigates VR's potential to deliver immersive multi-user experiences across long distances through the development of two distinct environments: a multiplayer basketball game and a multi-user biology lab. The basketball game aims to replicate outdoor sports experiences in a home setting, thus enabling individuals who cannot engage in physical activities to enjoy a similar experience. In contrast, the biology lab is designed for educational purposes, replicating university-level laboratory sessions to facilitate enhanced learning.

The project seeks to address key questions: What are the essential components of an immersive VR experience? What qualities do users expect from such an experience? To explore these questions, eight participants, including undergraduate students from fields such as computer science and biology, were recruited. The group consisted of 62.5% male and 37.5% female participants, with 75% having previous VR experience. The remaining participants reported

varying levels of VR familiarity. These participants interacted with each environment in pairs with minimal guidance to evaluate the intuitiveness of the systems. Each session was evaluated using the System Usability Scale (SUS) and a brief quantitative interview.

According to the results, the Multi-user Collaborative VR Biology Lab showed considerable promise as an educational tool but also highlighted several challenges. Only 50% of users expressed a desire to frequently use the system in the future. This response was attributed to difficulties with interaction mechanics, unintended behaviors, and insufficient graphical clarity. Common issues included problems with teleportation and distance grab functions, as well as unrealistic physics and low-resolution visuals. Despite these challenges, the lab's educational potential was acknowledged, with most participants indicating interest in a more refined version of the environment.

On the other hand, the Multiplayer VR Basketball Game received mixed feedback. While 87.5% of users found the system easy to use, inconsistent throwing mechanics diminished the immersive experience. The graphics were perceived as lacking realism, and the absence of features such as dribbling further impacted user engagement. Participants recommended improving interaction quality and enhancing realism to improve the overall experience.

Overall, the SUS results highlighted critical areas for improvement in both environments. The Biology Lab requires enhancements in interaction mechanics, visual quality, and system integration to achieve its educational goals. Meanwhile, the Basketball Game needs refinements in gameplay mechanics and visual fidelity to boost user engagement. The primary takeaway from this usability testing is that users expect consistent behavior from interactive elements and clear visuals from immersive VR experiences. Future usability testing, particularly with real-time user communication, will be crucial for optimizing the collaborative and competitive aspects of these VR environments. By addressing these issues, the project aims to deliver a polished and immersive VR experience that meets high standards in contemporary HCI applications and contributes valuable insights to the field.

Developing Affordable and Accessible Mobile Mixed Reality Environment: Usability and Interaction Testing with Head-Gaze Interaction, Hand Tracking, and Passthrough Features

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Key Words: Mixed Reality, Passthrough, Head-Gaze, Hand Tracking, Barrel Distortion

This paper presents the development and evaluation of a mixed reality (MR) environment designed to provide interactive and immersive experiences using accessible mobile devices. While users can visualize and interact with the virtual environment, they will also be able to interact and view real life through the passthrough technology (Guo et al., 2024) with the mobile phone's camera. Mobile devices will be located in cardboard or plastic virtual reality (VR) glasses with lenses which users will be able to view the phone screen through. The mobile phone's screen will include the camera output as well as the virtual objects and user interface (UI) embedded in the 3D real world. It is possible to track and recognize real-life objects for visual and interaction purposes. Moreover, users can interact with the user interface provided by virtual buttons projected in the 3D scene. For interaction by image tracking, we implemented hand tracking which allows users to make gestures to trigger actions in the scene. In terms of UI, we opted for head-gaze interaction (hover) that requires users to gaze at a certain button or an object by aligning the pointer in the middle of the screen with the interactable object (Blattgerste, et al., 2018). With this combined interaction scheme, users could efficiently navigate through the app with a head-gaze and produce special interactions with their hands. Furthermore, to fix the distortion caused by the lens, counter distortion is applied to the output image, creating a natural and clear visual.

The study utilized Unity Engine to build the environment, implement the head-gaze interaction

via raycasts, and adjust the camera so that it becomes compatible with virtual reality. These adjustments include having two cameras for both eyes and implementation of barrel distortion with a post processing shader. For augmented reality, a dual approach was established with the AR Foundation (Unity Technologies, n.d.) and Manomotion SDK (ManoMotion, 2024) due to their compatibility with each other (Lam & Nilsson, 2019; Jo et al., 2022). The applications developed in this environment included a campus tour, an educational interactive experience with virtual deans, and two games focusing on hand tracking and head-gaze interactions.

User testing was conducted with 15 participants, resulting in a System Usability Scale (Brooke, 1996) score of 78.17 and this score indicates high usability and user satisfaction (UX Research, 2017). Feedback highlighted the ease of interaction with head-gaze and hand-tracking features, although some challenges were noted, particularly among less experienced users. The applications were praised for their clarity and minimal visual discomfort, with average scores for dizziness, headache, and nausea remaining extremely low. This study emphasizes the potential of mixed reality technologies to offer compelling experiences at a fraction of the cost of traditional systems, making MR more accessible to a broader audience with the prevalence of mobile devices. The findings suggest that the developed MR environment can be both engaging and practical, providing valuable insights for future research and development in this field. Results show that the developed MR environment not only meets usability standards but also opens up new avenues for cost-effective integrations of various areas such as education, entertainment, training, and cultural or informational experiences. As mobile mixed reality becomes more widespread, improvements in computing power on mobile devices will pave the way for more advanced computer vision and 3D rendering technologies, allowing for more immersive mixed reality experiences.

Development of a Cost Effective System to Identify Dyslexia by Eye Tracking Technology

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Key Words: Dyslexia, Eye tracking, Machine Learning, Convolutional Neural Network

Dyslexia is a common learning disorder that causes children to struggle with reading, comprehension, and writing skills. The diagnosis and monitoring of dyslexia with current methods require comprehensive tests and expert support, which can be time-consuming and costly. The primary aim of this study is to develop a simpler, faster, and more accessible method for diagnosing and monitoring dyslexia using Machine Learning (ML) and Artificial Intelligence (AI) models.

This study began with the implementation of the Reading and Writing Assessment Battery (OYAB - Okuma Yazma Değerlendirme Bataryası), Working Memory Scale (WMS), Rapid Naming Test (RNT) and intelligence test on 143 second and third grade students in 23 primary schools and rehabilitation centers in Ankara. OYAB is a comprehensive test battery that evaluates children's reading, reading comprehension, and writing skills. It includes 10 tests and in each test the number of words or items that the child can read, write or answer correctly within a certain time (e.g., one minute, 90 seconds, etc.) is determined as the performance score. These tests are designed to classify students' reading, reading comprehension, writing, and composite

scores based on set cut-off points for performance evaluation. In addition, students were assessed using WMS, RNT and an intelligence test. All test results were evaluated together using certain criteria to classify students as those with dyslexia, those with low reading achievement and those with average reading achievement, and the extent to which the model predict this classification was examined.

The primary aim of this study is to develop a simpler, faster, and more accessible method for screening, diagnosing and monitoring dyslexia using Machine Learning and Artificial Intelligence models. To this end, students were asked to read narrative and educational texts, their eye movement were recorded by using an eye-tracking device, and the resulting data was recorded in JSON format A multi stream 1D Convolutional Neural Network (1D CNN) model was employed to analyze the students' reading behaviors. The proposed model utilizing both gaze coordinate streams and a feature vector input. Various 1D CNN configurations and different ways of segmenting the dataset were evaluated, with the best results compiled. The model's performance was tested with test data, yielding higher accuracy rates than initially anticipated. The proposed method obtained 85.0% classification accuracy. This method offers a more accessible and straightforward alternative for assessing students with dyslexia. The findings indicate that the multi-input 1D CNN demonstrated promising results in detecting dyslexia with minimal preprocessing.

This methodology offers a simpler and more accessible alternative for assessing students' learning difficulties because of dyslexia.

Digital Economic Transformation: Global Challenges and Opportunities

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Key Words: Digital transformation, economic system, human computer interface.

Digital transformation of the economy is an important aspect of the modern development trend that has a significant impact on global economic processes. Digital transformation of the economy implies fundamental changes in economic processes and business models under the influence of digital technologies. This is the process of adapting traditional ways of doing business and interacting in the economy to new technological opportunities, such as the Internet, artificial intelligence, blockchain, cloud computing, big data and the Internet of Things (IoT). In the context of globalization, digital transformation is becoming a necessity for all countries and enterprises that want to protect and strengthen their positions in the global market. The main objective of the study is to analyze modern trends in the digital transformation of the economy, identify the main problems and opportunities, and prepare recommendations for the successful application of digital technologies in various sectors of the economy. The purpose of the study is to identify factors contributing to successful digital transformation and identify obstacles that can slow down or stop this process. The object of the study is the global and national economy, as well as individual industries and enterprises at different stages of digital transformation. Particular attention is paid to economic development reforms in both developing and developed countries in order to identify common and specific features in the digitalization process. Key challenges faced by countries and enterprises in the digital transformation include lack of infrastructure, skills shortages, cybersecurity and data protection, and employee and management resistance to change. The lack of a clear strategy and planning can also lead to inefficient use of resources and a slowdown in the pace of digitalization. Prospects for the development of digital economic

transformation include the creation of new markets and business models, increased efficiency and productivity, improved quality of products and services, development of new forms of employment and improved living standards as well as improved human-computer interface, ensuring more efficient implementation of the above-mentioned processes. An effective human-computer interface (HCI) is the basis for the successful application of digital technologies in various sectors of the economy, ensuring the convenience and accessibility of modern technologies for users. Firstly, two interfaces facilitate user interaction with digital platforms and systems, which is especially important in the context of rapidly growing data volumes and the complexity of business processes. Convenient and intuitive interfaces allow employees to quickly adapt to new tools and technologies, which contributes to increased productivity and efficiency. Secondly, the development of HCI helps improve user experience (UX), which is becoming an important factor in the competitiveness of companies. In the digital economy, when consumers increasingly interact with companies through online platforms and mobile applications, high-quality experience ensures high customer satisfaction and audience retention. In addition, human-computer interfaces play an important role in ensuring the accessibility of technologies for a wide range of users, including people with disabilities. This contributes to more inclusive economic growth and market expansion, which is an important aspect of digital transformation. An important aspect of HCI development is ensuring cybersecurity and data protection. Intuitive interfaces can help increase user awareness of security measures and reduce the risk of data leaks and cyberattacks, which are one of the main challenges of digital transformation. At the World Economic Forum held in 2024, future professional areas related to the development of HCI were classified as related to the integration of artificial intelligence and machine learning. This will allow the development of adaptive professional areas that can take into account the individual needs and preferences of users in industries. Thus, the development of human-computer interfaces is closely related to the process of digital transformation of the economy, since it ensures the convenience, safety and accessibility of using modern technologies, which helps to successfully implement innovations and achieve sustainable economic growth.

Dijital Oyun Tabanlı Öğrenmede Metodolojinin Gücü: Sistematik İnceleme Çalışması

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Key Words: Dijital oyun tabanlı öğrenme (DGBL), Eğitimde dijital oyunlar, metodoloji

Dijital oyunlar, eğitim-öğretim süreçlerinde öğrenci katılımı, motivasyonu ve bilgi edinimi üzerinde önemli ölçüde olumlu etkiler sağlamakta olup, mühendislik eğitiminde yapılan bazı çalışmalar, dijital oyun tabanlı öğrenmenin öğrencilerin katılımını artırarak farklı mühendislik disiplinlerinde öğrenme kazanımları sağladığını göstermektedir (Udeozor ve ark, 2023). Benzer şekilde, Petri ve arkadaşlarının (2019) çalışması, dijital oyunların bilgisayar eğitiminde öğrencilerin öğrenme deneyimlerini pozitif yönde etkilediğini ve derslere olan ilgiyi ve motivasyonu artırdığını belirtmiştir. Bu bulgular, dijital oyunların eğitimde etkin bir araç olabileceğini gösterebilir.

Eğitimde dijital oyunların etkinliğini değerlendiren ve benzer sonuçlara ulaşan çalışmalarda bulunmaktadır. Örneğin, dijital oyun tabanlı öğrenmenin ilkokul düzeyinde bilim eğitiminde öğrencilerin akademik başarılarını ve motivasyonlarını artırdığını gösteren çalışmalar bulunmaktadır. Ancak, daha fazla randomize kontrollü çalışma yapılması gerektiği ve dijital oyun tabanlı öğrenmenin diğer öğrenme modlarıyla karşılaştırılması gerektiği vurgulanmıştır (Hussein ve ark., 2019). Dubé ve Dubé (2020) ise pandemi döneminde dijital öğrenmenin benimsenmesiyle birlikte dijital oyunların eğitimde kullanımının arttığını ve bu süreçte karşılaşılan zorlukları ele alarak, eğitimde oyun kullanımını destekleyecek politika alanlarının belirlenmesi gerektiğini önermiştir.

Dijital oyunların eğitimde kullanımında metodolojik unsurların etkisi önemli bir konudur. Örneğin, Solorzano Alcivar ve arkadaşları (2022), dijital oyunların kullanımı sırasında metodolojik unsurların etkinliğini değerlendiren bir model önermekte ve özellikle erken çocukluk eğitiminde kullanılan dijital oyunların etkinliğini artırmak için oyunlaştırma ve diğer yenilikçi stratejilerin

uygulanmasını önermektedir. Manesis (2020), dijital eğitim oyunlarının ilköğretimde nasıl kullanılabileceğini ve öğretmenlerin bu oyunlar hakkındaki görüşlerini incelemiş ve dijital oyunların öğrenme sürecini olumlu yönde etkileyebileceğini, ancak öğretmenlerin bu oyunları kullanma konusundaki endişelerinin giderilmesi gerektiğini vurgulamıştır. Benzer şekilde, Giang ve Cuong (2021), dijital oyun tabanlı öğrenme teknolojisinin uygulanabilirliğini ve etkinliğini değerlendirmiş ve dijital oyunların öğrenme sürecine katkı sağladığını belirtmiştir.

Dijital oyunların eğitimdeki kullanımıyla ilgili literatürde bazı eksiklikler bulunduğu ifade edilebilir. Hussein ve arkadaşlarının (2021) yaptığı inceleme, dijital oyun tabanlı öğrenmenin farklı dinamiklerinin (örneğin, işbirlikçi/rekabetçi) öğrencilerin öğrenme üzerindeki etkilerini inceleyen daha fazla araştırmaya ihtiyaç olduğunu vurgulamaktadır. Ayrıca, yaratıcı düşünme ve eleştirel düşünme gibi yirmi birinci yüzyıl becerilerinin dijital oyun tabanlı öğrenmede nasıl geliştirilebileceğine dair daha fazla araştırma yapılması gerekmektedir (Yi & Yunus, 2023). Udeozor ve arkadaşları (2023) ise dijital oyunların mühendislik eğitiminde kullanımıyla ilgili metodolojik boşlukların doldurulması gerektiğini belirtmektedir. Bunun yanı sıra, Manesis (2020) öğretmenlerin dijital oyunları sınıflarında kullanma konusundaki endişelerinin giderilmesinin önemini vurgulamaktadır. Sun ve arkadaşlarının (2020) çalışması, ilkokul eğitiminde dijital oyun tabanlı pedagojik aktivitelerin etkisini incelemiş ve oyun tabanlı öğrenmenin bilgi kazanımı, tutum ve motivasyon, beceri gelişimi ve davranış değişikliği gibi öğrenme çıktıları üzerindeki etkilerini ortaya koymuştur. Dijital oyunların eğitimde etkili ve verimli bir şekilde kullanılabilmesi, öğrencilerin öğrenme süreçlerine olan katkısının artırılması ve eğitimin kalitesinin yükseltilmesi için kritik bir rol oynamaktadır.

Birçok eğitim-öğretim kademesinde dijital oyunlar uygun metodolojik unsurlar ile uygulanması durumunda öğrenci katılımı, motivasyon ve bilgi edinimi üzerine olumlu etki göstermektedir (Bakhsh vd., 2022; Hussein vd., 2022). Dolayısıyla dijital oyunların öğrenme süreçlerinde kullanılmasına yönelik etkilerin değerlendirilmesi önem arz etmektedir. Dijital oyunların öğrenme süreçlerinde kullanılması durumunda olumlu etkileri veya olumsuz etkilerin değerlendirilmesi ve gelecek çalışmalarda dikkat edilmesi gereken unsurların ortaya çıkarılması dikkate değer bir durumdur. Buradan hareketle bu çalışmada da 2019-2024 yılları arasında dijital oyunların kullanılarak yürütülen çalışmaların derlenmesi ve derleme çıktılarının bu çalışmalarda ki olumlu-olumsuz unsurların tespit edilerek öğrenme süreçlerinde meydana gelebilecek olası problemlerin

ortadan kaldırılmasına yönelik rehber sunulması hedeflenmiştir.

Eğitim hedefleri ve öğrenme sonuçlarıyla uyumlu açık ve standart hale getirilmiş metodolojiler ile dijital oyunların öğrenme faaliyetlerinde kullanılmasına yönelik gelecekte yapılacak çalışmalarda bu eksikliğe odaklanma gerekliliği literatürde de ifade edilmektedir (Myers vd., 2023; Tokarieva vd., 2019). Dolayısıyla çalışma kapsamında literatürde bulunduğu ifade edilen boşluğun doldurulmasında bu çalışma ile katkı sağlanması amaçlanmıştır.

Çalışma, 2019-2024 yılları arasında dijital oyunların eğitim-öğretim amaçlarıyla kullanıldığı araştırmalarda benimsenen metodolojileri incelemeyi amaçlamaktadır. Çalışmanın yöntemi, 180 makalelik bir tarama sonucunda seçilen ve analiz edilen 130 uygun makalenin incelenmesidir. En yaygın kullanılan araştırma yönteminin deneysel çalışmalar (%43.08) olduğu belirlenmiştir. Çalışmalar genellikle üniversite düzeyinde (%36.15) ve karma örneklem gruplarıyla gerçekleştirilmiştir. Eğitsel oyunlar en yaygın kullanılan oyun türü olup, puanlama ve geri bildirim en sık kullanılan oyun mekanikleridir. Dijital oyunların öğrencilerin akademik performansını, motivasyonunu ve sosyal etkileşim becerilerini olumlu yönde etkilediği tespit edilmiştir. Çalışmanın sonuçları, dijital oyunların eğitimde etkin bir araç olarak kullanılabileceğini ve öğrenme deneyimlerini zenginleştirebileceğini göstermektedir. Öneriler arasında deneysel ve karma yöntemlerin yaygınlaştırılması, eğitsel oyunların geliştirilmesi, öğretmen eğitimi ve teknik altyapının güçlendirilmesi yer almaktadır. Bu bulgular, dijital oyunların eğitimdeki potansiyelini en üst düzeye çıkarmak için önemli adımlar atılmasını önermektedir.

Dijital Teknik Destek Süreçlerinin Optimizasyonu ve Kurumsal Hafızanın Korunması: Dinamik Bir Sistem Yaklaşımı

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Key Words: Kullanıcı Deneyimi, Dijital Teknik Destek, Kurumsal Hafıza Yönetimi

Bu çalışma, teknik destek süreçlerinin dijitalleştirilmesi ve kurumsal hafızanın korunması amacıyla geliştirilen dinamik bir sistemin tasarımı, uygulanması ve test edilmesini kapsamaktadır. Geleneksel olarak manuel yöntemlerle yürütülen teknik destek ve bakım süreçlerinin verimliliğini artırmak üzere geliştirilen bu sistem, kullanıcıların taleplerini dijital ortamda kaydedip takip edebilmelerine olanak tanıyan entegre bir çözüm sunmaktadır. Sistem, sadece teknik destek taleplerinin yönetimini sağlamakla kalmamakta, aynı zamanda üniversitenin birimlerine sağlanan desteklerin ve kaynak kullanımının detaylı bir şekilde raporlanmasını mümkün kılmaktadır.

Sistemin işlevselliği ve kullanılabilirliği, 9'u bilgi işlem personeli ve 54'ü destek alan kullanıcı olmak üzere toplam 63 katılımcı ile gerçekleştirilmiştir. Kullanıcı deneyimini derinlemesine incelemek amacıyla yapılan odak grup görüşmeleri, yeni dinamik sistemin önceki manuel formlarla kıyaslandığında belirgin avantajlar sunduğunu ortaya koymuştur. Özellikle kullanıcıların sistemi benimsemesi ve verimli bir şekilde kullanabilmesi üzerine yapılan analizler, sistemin işlevsel olduğu kadar kullanıcı dostu olduğunu da göstermektedir. Sistemin ikinci aşaması, kurumsal hafızanın korunmasına yönelik olarak tasarlanmıştır. Bu kapsamda, yazılım lisansları ve sarf malzemeleri gibi kurum için kritik öneme sahip alımların kayıt altına alınması ve bu süreçlerin sistem üzerinden takip edilmesi sağlanmıştır. Kurumda personel değişiklikleri gibi durumlarda bilgi kaybının önüne geçilmesi hedeflenmiş; bu doğrultuda, yeni gelen personelin geçmiş işlemleri kolayca tarayabilmesi için kapsamlı bir veri tabanı oluşturulmuştur.

Bu iki aşamanın tamamlanmasının ardından, sistemin genel kullanılabilirliğini ve etkinliğini

değerlendirmek amacıyla 8 bilgi işlem personeli ile odak grup görüşmeleri yapılmıştır. Bu görüşmelerde, sistemin tüm bileşenleri ele alınmış ve genel kullanıcı memnuniyeti ile operasyonel verimlilik üzerine derinlemesine analizler yapılmıştır. Sonuçlar, sistemin sadece operasyonel verimliliği artırmakla kalmayıp, aynı zamanda kurum içi süreçlerin sürdürülebilirliğine de önemli ölçüde katkı sağladığını ortaya koymuştur.

Bu çalışma, geliştirilen sistemin teknik destek süreçlerinin iyileştirilmesi ve kurumsal hafızanın korunması üzerindeki etkilerini kapsamlı bir şekilde ele almakta ve dijitalleşmenin kurumsal yönetim üzerindeki olumlu etkilerini vurgulamaktadır.

EEG Tabanlı Duygu Tanıma ile Kişiselleştirilmiş Bir Müzik Öneri Sistemi

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Key Words: Duygu tanıma, beyin-bilgisayar arayüzü, EEG, sinyal işleme, müzik öneri sistemi, ESA

İnternet ve ağ teknolojilerindeki gelişmelerle birlikte, müzik veri akışı servisleri üzerinden içeriklere erişim kolaylaşmış, ancak erişilebilen bu oldukça geniş müzik havuzunda dinleyicilerin sevecekleri müzikleri bulup organize etmeleri (Pachet ve Aucouturier, 2004) ve kişiselleştirilmiş öneriler oluşturulması önemli bir sorun olarak ortaya çıkmıştır (Chidambaram, vd., 2021). Spotify ve Apple Music gibi platformlar, genellikle geçmiş veriye dayalı olduğundan, kullanıcının içinde bulunduğu duygu durumuna uygun öneriler sunmakta yetersiz kalabilmektedir (Shreya ve Nagarathna, 2021; Ayata, vd., 2018). Bu nedenle, duygu durum tespiti yaparak öneri listesi sunan sistemler, müzik öneri sistemlerinin başarımını artırabilir. Beyin-ilgisayar arayüzlerinde kullanılan biyosensörlerden Elektroensefalografi (EEG), cerrahi müdahale gerektirmediği ve insan beyninde gerçekleşen motor, bilişsel ve duygusal olaylar sırasında nöronlar arasında oluşan çok düşük şiddetteki elektrik akımını kaydedebildiği için duygu tanıma çalışmalarında en çok kullanılan yöntemlerin başında gelmektedir (Alakuş ve Türkoğlu, 2018).

Bu çalışmada EEG tabanlı duygu tanıma ile elde edilecek kullanıcı duygu durumunun bir müzik öneri sistemine entegre edilmesi hedeflenmektedir. Bunu sağlamak için bir mobil müzik öneri uygulaması geliştirilmiştir. Bu uygulama, kullanıcıların müzik dinlerken oluşan duygu durumlarını tespit etmek için Emotiv Epoc+ cihazı ile kaydedilen EEG sinyallerini kullanarak, bu duygu durumlarına uygun müzik önerileri sunmaktadır. Bu amaçla üç aşamalı bir çalışma süreci tanımlanmıştır. İlk aşamada, sağlıklı 8 katılımcıya Türkçe bir müzik veri kümesindeki (Er ve Aydilek, 2019), mutlu (yüksek değerlik) ve üzgün (düşük değerlik) kategorilerinden rastgele seçilen 10 adet 30 saniyelik parça dinletilmiş ve müziklerin duygusal etkilerini SAM kullanarak değerlendirmeleri istenmiştir. Böylelikle müzik ile tetiklenmiş bir EEG veri kümesi oluşturulmuştur. İkinci aşamada, EEG sinyalleri ön işleme adımlarından geçirilerek, müzik önerilerinde kullanılacak olan duygu sınıflandırması için Evrişimli Sinir Ağı (ESA) modeli kullanılarak eğitim gerçekleştirilmiştir. Son adımda ise eğitilen bu model bir müzik öneri uygulamasının kullanıcıların duygu durumlarına göre özelleştirilmiş müzik öneri listeleri sunması için entegre edilmiştir.

Çalışma kapsamında geliştirilen öneri sistemi, yüksek değerlik (mutlu) ve düşük değerlik (üzgün) duygu durumlarını sınıflandırmada başarılı bir performans göstermiştir. Alan yazında bazı çalışmalarda PPG ve GSR gibi ek fizyolojik verilerin dahil edildiği çok modlu yaklaşımlar kullanılarak duygu tanıma doğruluğunun arttırılmaya çalışıldığı bazı çalışmalar (Shreya ve Nagaratha, 2021; Ayata vd., 2018) olsa da bu çalışmada sadece EEG sinyallerine odaklanılmış ve bu sayede düşük maliyetli bir çözüm sunularak pratik uygulamalar için potansiyeli değerlendirilmiştir.

eHealth, Digital Healthcare Studies, and Medical Devices

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Key Words: Artificial Intelligence, Computed Tomography, Deep Learning, Convolutional Neural Networks, Generative Adversarial Networks, Vision Transformers, Image Reconstruction, Radiology, Medical Imaging, Diagnostic Accuracy

The incorporation of Artificial Intelligence into Computed Tomography imaging marks a significant breakthrough in radiology, revolutionizing diagnostic procedures, improving image quality, and enhancing workflow efficiency. This article examines the key Artificial Intelligence technologies currently revolutionizing Computed Tomography imaging, such as deep learning models, Convolutional Neural Networks, Generative Adversarial Networks, and Vision Transformers. These technologies play a crucial role in various aspects of medical imaging, including image segmentation, reconstruction, and patient positioning, leading to notable advancements in clinical outcomes and patient care.

Artificial Intelligence-driven approaches have shown exceptional effectiveness in reducing noise in low-dose Computed Tomography scans, thus improving the reliability, accuracy, and safety of these procedures. Innovations in image reconstruction, particularly through deep learning methods, have resulted in the creation of clearer, more diagnostically valuable images, which are essential for the precise detection and treatment planning of various medical conditions. These technological advancements not only enhance the accuracy of Computed Tomography imaging but also streamline the radiology workflow by automating routine and time-intensive tasks, allowing radiologists to focus more on complex cases.

Additionally, this article explores the crucial steps involved in the validation and clinical adoption of Artificial Intelligence models, emphasizing their vital role in the ongoing modernization of

healthcare. The ability of Artificial Intelligence to analyze vast datasets with unmatched precision is transforming how medical diagnoses are made and treatment plans are developed. By increasing the accuracy and speed of these processes, Artificial Intelligence is paving the way for more personalized, efficient, and effective healthcare delivery.

The integration of Artificial Intelligence into Computed Tomography imaging represents not just an improvement but a transformative shift in radiological science. As Artificial Intelligence technologies continue to evolve and advance, their influence on medical imaging is anticipated to expand significantly, offering unprecedented opportunities for early disease detection, optimized patient management, and ultimately, better health outcomes worldwide.

Enhancing Language Proficiency: Analysing the Impact of Microsoft Teams' AI-Supported Speaking Progress Tool on Speaking Feedback

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Key Words: AI in Language Learning, Speaking Feedback, Language Proficiency, Microsoft Teams, Speaking Progress Tool

The ongoing research, initiated in August 2024, investigates the impact of Microsoft Teams' AI-Supported Speaking Progress Tool (MS-AISSPT) on enhancing the quality of feedback for language learners preparing for the International English Language Testing System (IELTS) exam within an English Intensive Program. This study explores how the utilization of MS-AISSPT can improve students' speaking proficiency by providing timely, individualized, and accurate feedback.

Set against a backdrop where language education increasingly integrates digital tools to meet modern learning demands, MS-AISSPT is designed to bridge the gap in traditional feedback mechanisms by offering automated, immediate responses to students' spoken submissions. The tool evaluates various aspects of speaking, including pronunciation, fluency, and grammar, and provides learners with actionable feedback aimed at enhancing their speaking abilities. Given the critical role of speaking proficiency in language acquisition and academic success, this study aims to assess the potential of MS-AISSPT to contribute to measurable improvements in students' language skills.

This study specifically seeks to answer the following research questions: 1. How effective is Microsoft Teams' Speaking Progress Tool in providing timely and accurate feedback on speaking

skills? 2. What impact does the Speaking Progress Tool have on students' speaking proficiency over time? 3. How do teachers and students perceive the usefulness and usability of the Speaking Progress Tool? 4. What are the potential limitations or challenges in using the tool for speaking feedback?

The study involves twenty-six students aged 21 to 25, all at the B1 level of English proficiency according to the Common European Framework of Reference for Languages (CEFR). These students, hailing from diverse academic backgrounds, are preparing for the IELTS exam as part of their postgraduate studies abroad. Additionally, four experienced English teachers aged 36 to 58, with a minimum of 10 years in teaching English as a foreign language, participate in the study. These teachers have varying degrees of expertise in educational technology, making them well-suited to evaluate the tool's impact from both pedagogical and technological perspectives.

Employing a mixed-methods approach, the research combines quantitative and qualitative data to thoroughly analyse MS-AISSPT's effectiveness. Students' speaking proficiency is assessed through pre- and post-intervention tests, and their performance is compared using paired sample t-tests to determine any significant improvements. Quantitative data analysis focuses on feedback quality metrics, including accuracy, timeliness, and relevance. Simultaneously, qualitative data is collected through surveys and interviews with both teachers and students to gauge their perceptions of the tool's usability and effectiveness. The qualitative data is then subjected to thematic analysis to identify common patterns and themes, providing deeper insights into the user experience.

The study's results are expected to demonstrate whether MS-AISSPT significantly enhances the quality of feedback provided to students. It will explore how the tool influences the immediacy and specificity of feedback, the extent to which it supplements instructional strategies, and the value students place on receiving instant, actionable feedback. Moreover, the research anticipates identifying any challenges encountered during the study, such as discrepancies in feedback accuracy or the need for further customization to cater to diverse learner needs.

In conclusion, the findings are expected to highlight the transformative potential of AI tools like MS-AISSPT in language education. The study aims to contribute to the growing body of

literature on AI in language learning by demonstrating how and to what extent such tools can enhance speaking proficiency within a structured educational setting. However, the research is also likely to underscore the necessity for ongoing refinement and customization of AI tools to effectively address the diverse and evolving needs of language learners, offering practical recommendations for educators and suggesting directions for future research in AI-supported educational environments.

Enhancing Personalized Music Recommendations through Emotional Analysis from Facial Images

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Key Words: Emotion Analysis, Song Matching, Face Recognition, Deep Learning, Convolutional Neural Network, Music Recommendation, Personalized Music Experience, Distance Metrics, Emotion Detection

This paper introduces a novel approach to enabling personalized music recommendation systems through the emotional analysis of facial images. We develop a convolutional neural network for emotion detection by using features extracted from images of facial expressions. The emotions detected are mapped to their corresponding attributes: Danceability, Happy, Sad, Relaxed, and Aggressiveness. A large song database was developed, annotated with these emotional attributes, and the extracted emotions were matched to the data of the Essentia mood classifiers in relation to songs in the database using several distance metrics: Mean Absolute Error (MAE), Cosine Similarity, and Pearson Correlation. Our experimental results show that it outperforms traditional methods of music recommendation in matters of accuracy of matching and also satisfaction of the user. A system like this would provide a more personal and emotionally appropriate musical experience to the user, based on their current emotional state as inferred from facial expression.

Ethics in AI: Navigating Human-AI Interaction

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Key Words: AI ethics, human-AI interaction, transparency, accountability, fairness, non-discrimination

This extended abstract examines the ethical implications of artificial intelligence (AI) in human-computer interaction, particularly in relation to AI systems that affect various domains such as healthcare, law enforcement, education, and everyday decision-making. It focuses on how key ethical principles like transparency, accountability, fairness, and respect for human rights shape the development and deployment of AI systems. These ethical considerations are becoming increasingly vital as AI systems are embedded into human interactions, altering the way decisions are made, and raising questions about moral responsibility and societal impact.

Drawing from the ”Ethics of AI” course provided by the University of Helsinki (n.d.) and building on the broader literature on AI ethics (Floridi & Cowls, 2019; Jobin, Ienca, & Vayena, 2019), it is outlined that AI ethics focuses on the norms and values that guide the development of AI systems. These include fundamental principles like beneficence (do good) and non-maleficence (do no harm). By applying these principles, the aim is to ensure that AI systems contribute to the common good and avoid harm, particularly in sectors where AI decisions can have significant human consequences (University of Helsinki, n.d.).

Key Ethical Principles in AI-Human Interaction A significant part of the presentation focuses on the principle of transparency in AI. Transparency is crucial in fostering trust between humans and AI systems, as it allows users to understand how AI reaches its conclusions. However, complete transparency carries certain risks, such as the potential for malicious exploitation of open AI systems or unintended consequences when too much detail is revealed (Mittelstadt et al., 2016).

The presentation will explore how transparency can be balanced with the need for security and privacy, ensuring that AI systems remain accountable without exposing sensitive operational details.

Accountability is another core theme. AI systems often operate without direct human intervention, leading to questions of who should be held responsible when an AI system malfunctions or causes harm (Floridi & Cowls, 2019). The concept of moral agency, traditionally applied to humans, becomes more complicated in the context of AI. There will be addressed the challenge of assigning responsibility for decisions made by algorithms, especially in cases where human involvement is minimal or indirect (University of Helsinki, n.d.).

Fairness and Bias in AI Systems A critical issue in human-AI interaction is fairness and the potential for bias in AI systems. Bias in AI can manifest in several ways, including through the data used to train systems or the algorithms themselves, which may reflect societal inequalities (Binns, 2018). There will be discussed how fairness is conceptualized in AI and the different types of fairness, such as procedural fairness (the fairness of the processes that produce outcomes) and distributive fairness (the fairness of the outcomes themselves). Techniques to reduce bias and create more inclusive AI systems will also be explored, such as algorithmic adjustments or improved data collection methods (Floridi & Cowls, 2019; University of Helsinki, n.d.).

Human Rights and AI Another focal point of the presentation is the intersection of AI and human rights, particularly the rights to privacy, security, and inclusion (European Commission, 2019). AI systems can pose significant challenges to privacy, given their ability to process and analyze vast amounts of personal data. Ensuring that AI respects privacy is critical in maintaining trust and protecting individual freedoms. In the presentation it will be examined how current AI ethics guidelines incorporate these rights and what further steps need to be taken to protect vulnerable populations, including children, from potential misuse of AI technologies (Jobin et al., 2019).

Practical Applications and Challenges In practice, applying these ethical principles to AI systems presents numerous challenges. Ethical guidelines for AI development, such as those proposed by the European Commission (2019), provide frameworks for ensuring that AI systems align with human values, but these guidelines are often difficult to enforce. Moreover, moving from

theoretical ethics to practical implementation requires a shift in how AI systems are designed and regulated. This presentation will discuss the future directions of AI ethics and the importance of continued interdisciplinary collaboration in shaping policies that ensure AI is used responsibly in human-computer interactions.

Conclusion In conclusion, the presentation emphasizes that AI ethics is not merely a theoretical endeavor but a practical necessity in today's rapidly advancing technological landscape. As AI systems increasingly influence human decisions, ensuring their fairness, transparency, accountability, and respect for human rights becomes essential. This presentation offers insights into how AI ethics can be integrated into human-AI interactions to foster trust, reduce harm, and promote the common good.

Evaluating Diversity, Novelty, and Serendipity Metrics in a Weighted Hybrid Job Recommendation System

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Key Words: Hybrid recommendation system, diversity, novelty, and serendipity metrics, personalized job recommendations

Personalized job recommendation systems aim to accelerate the job-seeking process by offering relevant job postings to job seekers. However, the effectiveness of these systems is not solely determined by accuracy but also by metrics like diversity, novelty, and serendipity. This study evaluates the performance of these three metrics in a weighted hybrid job recommendation system using data from Kariyer.net. The recommendation system was developed using a weighted hybrid algorithm that combines content-based and collaborative filtering methods, considering job seekers past interactions, sector preferences, and position information. Diversity was measured using the Intra-List Diversity metric to evaluate how distinct the recommended jobs are from one another. Novelty was assessed by analyzing the popularity of the recommended jobs and how unfamiliar they are to the user. Serendipity was measured by the proportion of recommendations that deviate from the user's profile yet remain interesting and relevant. The findings highlight that recommendation systems should not only focus on matching users' existing preferences but also provide a broad range of job opportunities, including unexpected ones. The impact of different

weighting strategies on diversity and serendipity metrics was examined in detail. These results emphasize the need for more balanced and innovative approaches in recommendation systems to enhance user satisfaction. This study offers valuable insights into the importance of diversity, novelty, and serendipity metrics in improving the effectiveness of hybrid job recommendation systems.

Evaluation of the Usability of Duolingo for Schools Application by Foreign Language Teachers

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Key Words: Duolingo for Schools, Usability, ELT, Teachers, SMEQ, SUS, TLX

Duolingo, which has become the most widely used language learning application worldwide by providing flexibility, control and motivation to its users, presented Duolingo for Schools platform available to educators for free in 2016 in order to increase the interaction of learners in language acquisition (Pothireddy, 2022). The aim of this study is to test the usability of Duolingo for Schools by measuring Foreign Language teachers' experiences of using this platform in the specified areas. Evaluation of the usability of Duolingo for Schools interface by educators using different criteria is important for the development of the platform. In this study, the experimental research method was used to determine how one or more variables affect one another (Gürses, 2006). The participants of the study were 9 English and 1 German teachers, aged between 29 and 47, working at Bahcesehir College Beylikduzu Campus in the 2023- 2024 academic year. All of the participants were female and 9 of them had bachelor's degree and 1 had a master's degree. Quantitative and qualitative data were collected about the usability of the Duolingo for Schools application. Demographic information of the users was collected through a user information questionnaire. The Subjective Mental Effort Question (SMEQ) was used to measure the difficulty level of the tasks given to the users, the Software Usability Scale (SUS) was used to measure the usability of the application, the NASA Task Load Index (TLX) scale was used for the overall evaluation of the tasks, and a 5-point Likert-type Satisfaction questionnaire was used to measure the users' satisfaction with the application. The qualitative data of the study were collected by taking audio recordings with the Think-aloud technique, also called Verbal protocol analysis (Gürses, 2006). In conclusion, although the Duolingo for Schools application interface seems easy

to use, the fact that the target language cannot be selected in the selection of the language of instruction, the system determines the activities assigned to the students, and the easiest process of exiting the page is not performed by almost any user causes the educators participating in the study to have difficulty in using the interface of the platform.

Exploring AI's impact on Modern research: Insights from the Northwest region of Azerbaijan

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Key Words: artificial intelligence, research, innovation

As AI technologies progress, their integration into academic research methods has become more common. AI is transforming data analysis skills and allowing researchers to work with larger datasets than previously was impossible. In addition, the creation of AI research centers promotes interdisciplinary cooperation between government, businesses, and academia, which stimulates creative solutions to challenging local issues.

However, there are significant barriers standing in the way of a strong AI ecosystem. Data privacy and ethical considerations grow more critical when researchers use massive datasets more often. Additionally, for the workforce to properly use and contribute to AI innovations, skill gaps must be filled.

A critical perspective on how AI might promote intellectual innovation and advancement is offered by this study. It also acknowledges the challenges, including the availability of technology and skilled labor deficits. The paper highlights the importance of integrating AI into Azerbaijan's academic and research environment in a balanced approach and offers policy recommendations for supporting this interconnection.

The study also looks at the validity and reliability of insights generated by AI, raising concerns about how reliable and consistent these technologies are across a variety of academic fields. The article also outlines issues regarding to the ethical application of AI, infrastructure constraints, and other region-specific difficulties experienced by Azerbaijani researchers.

The paper will provide a comprehensive view of the influence of AI on modern research in the northwest region of Azerbaijan, emphasizing both areas of potential growth and obstacles that need to be solved.

To conduct research on this topic a 20-question survey was developed. The questions were designed to cover various aspects of the topic. The survey was conducted among the staff of the UNEC Zagatala branch, Sheki section of ANAS, Zagatala regional experimental station, and Sheki Pedagogical University, to gather information on the use of AI by the researchers in the northwest region of Azerbaijan.

Exploring Authentic Interactions in ESL Writing: Balancing AI and Teacher Feedback

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Key Words: AI-supported automated writing evaluation (AWE), AI-generated feedback, formative feedback, English as a Second Language (ESL), writing instruction, usability

This action research aims to explore the distinct characteristics and interactions of teacher feedback and AI-supported Automated Writing Evaluation (AWE) tools, focusing on how students learning English as a Second Language (ESL) engage with these feedback modes and the factors influencing these interactions. The study, conducted during the Spring 2024 semester, involves 17 B1-level university students (aged 18-22) enrolled in a preparatory program at a private university in Turkey. The research combines quantitative and qualitative data collection tools to gain a comprehensive understanding of the effects of AI-assisted feedback during writing lessons, which span 8 hours per week. Qualitative data are gathered from focus group interviews with students and subject matter experts, as well as researcher field notes, focusing on their experiences and perceptions of using AI tools and traditional teacher feedback. The significance of this study lies in its contribution to understanding the complex roles and interactions of AI and human feedback in language learning, addressing the challenges of digital literacy, and the practical integration of AI tools in educational settings.

Findings reveal that although the AI tool offers prompt and detailed feedback, students predominantly favor teacher feedback for its personalized and context-aware approach. Interviews and observations indicate that students interact differently with the writing content depending on the feedback method. Bako's (2023) study indicates that AWE tools help correct lower-level errors, allowing teachers to focus on higher-level skills like organization and content. However, while AI

feedback provides immediate corrections, students often find it overwhelming and sometimes confusing. The System Usability Scale (SUS) indicates moderate usability of the AI tool, with an average score of 63.24. Despite the valuable feedback provided by the AI, perceived usability challenges hinder effective learner-content interaction. Both teacher and student feedback highlight the necessity of addressing digital literacy and technical challenges to maximize the effectiveness of AI tools in educational settings. They appreciate the efficiency of AI-generated feedback but value the personalized guidance from teachers more. This supports Yildiz's (2021) finding that AWE feedback effectively reduces mechanical and usage errors, yet students still prefer teacher feedback for comprehensive guidance despite some limitations. Additionaly, Chen and Pan (2022) argue that AWE tools alone may be insufficient to meet students' needs for improving writing performance, advocating for a hybrid model that includes both AWE and teacher feedback.

Overall, this study highlights the need for balancing AI technology with personalized support in writing instruction to enhance student learning outcomes, such as writing proficiency, motivation, and engagement. Saricaoglu (2018) notes that while there are limited insights into how EFL learners in countries like Turkey interact with these feedback mechanisms and their impact on writing proficiency over time, the development of more sophisticated AI-supported feedback tools continues to grow, necessitating further research in this area. Therefore, exploring the specific preferences and needs of EFL learners in Turkey regarding AI-supported feedback can provide valuable insights for designing effective writing instruction.

Exploring the Impact of Augmented Reality on Student Motivation, Learning, and Classroom Dynamics

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Key Words: Augmented Reality, ARC Geography Application, Student Engagement, Qualitative Research, Phenomenological Investigation

This study presents findings from a qualitative research project examining student motivation, learning outcomes, and classroom dynamics in two middle schools who have agreed to cooperate with us for our study in Turkey and China regarding the use of Augmented Reality (AR), especially with the use of the ARC Geography application. A phenomenological approach was adopted to capture the experiences of eighteen middle school students of mixed gender in China and 12 students in Turkey, along with their teachers, as they interacted with Augmented Reality technology in their classrooms. The research aimed to understand how Augmented Reality could influence not only students' academic performance but also their engagement and interaction with teachers.

Data were collected through semi-structured interviews conducted over a three-month period following the implementation of Augmented Reality in geography instruction. The thematic analysis of this data revealed three primary themes: enhanced student motivation, improved conceptual understanding, and evolving classroom dynamics. Specifically, the results indicated that AR significantly boosted student motivation, making learning more enjoyable and engaging. It also facilitated a deeper understanding of complex concepts such as tectonic plates, earthquakes, and volcanic activities, which are traditionally challenging to teach.

However, the study also highlighted challenges faced by teachers, including technical issues with the AR application and the additional preparation time required to effectively integrate this

technology into their lessons. These findings underscore the potential of AR to revolutionize traditional education by creating more interactive and engaging learning environments but also emphasize the need for adequate support and training for educators.

The study concludes by advocating for the integration of AR into school curricula and recommending comprehensive professional development programs for teachers. These implications suggest both new directions for future research in educational technology and practical strategies for enhancing the effectiveness of AR in classrooms, ultimately aiming to better prepare students for the demands of a rapidly evolving digital world.

Exploring the Requirements of Parents for AI-based Storytelling Platform 'Storywizard.ai' among Preschoolers

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Key Words: AI(Artificial Intelligence), AI Big Ideas Framework, Storywizard.ai, storytelling

Many studies have shown the remarkable effects of both traditional and digital storytelling on preschooler's language learning development. At this point, parents have always been the supporter or partner of their children to contribute to their language learning process better. However, with the rise of AI technologies, traditional storytelling has been replaced by AI based storytelling. Therefore, this study investigates the needs of parents while using an AI based storytelling platform which is 'Storywizard.ai' and focuses on whether there is a connection between the demographic information of the parents and AI knowledge. To address this gap in the literature, a case study has been carried out and a qualitative method has been employed with 8 parents of preschoolers by using 'Storywizard.ai' platform through the interview questions which are designed according to the AI Big Five Ideas Framework in a private kindergarten in Istanbul. In order to conduct the study, the interview questions transcribed into Turkish verbatim. In addition, participants' permission was taken with a consent paper and the results were evaluated based on the thematic analysis. For further studies in English language teaching, this case study may be a pioneer for the future development of AI based language teaching and learning processes at schools in terms of both parents and students instead of using traditional learning language. The findings indicate that there are some potential needs for the parents to utilise AI based technologies to support the preschoolers in language learning not only having technological knowledge but also a lack of parents' English level.

Exploring Visual Learning Analytics to Analyze Embodied Cognition of Players

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Key Words: Visual Learning Analytics, Sankey diagrams, From Here to There (FH2T), mathematics game, embodied cognition

This research delves into how certain visual learning analytics reveal players' embodied cognition and experience in the mathematics learning game From Here to There! (FH2T). In this manuscript, we examine how Sankey diagrams represent the flow of the actions for FH2T puzzles, specifically through the lens of embodied cognition. We conclude by recommending considerations for using visual analytics in educational game research.

Eye-Tracking Technology in Education

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Key Words: Eye Tracking Technology, human Computer Interaction, education

The combination of learning with technology and development in digital education opened space for eye-tracking technology in education. Eye tracking is an advanced technology used to collect and observe behavioural data such as eye movements, focus points, and pupil sizes. Recently this technology has become increasingly popular in the literature of education to understand how learners learn and how their learning processes develop. This study aims to show the popularity of eye-tracking technology in education. The study seeks to answer the following research questions, considering the developments in the literature and major innovations in technology.

RQ1: Is there an increase in the use of eye-tracking technology within the scope of human-computer interaction in education?

RQ2: Is using eye-tracking technology in education an opportunity for current studies?

The visual system and eyes have been known as the most developed and the sense of first contact in life since the moment humanity came into being. The importance of the visual function has been the subject of different interdisciplinary studies (Coco, 2022). Today, with the rapid

development of technology, eye-tracking devices are widely used in scientific studies and research (Donmez, 2023). While eye-tracking technology tracks eye movements to interpret where people focus and how long they look, it also measures eye position, movement and pupil size to determine people's areas of interest (Klaib et al., 2021). Eye tracking technology is used in many different disciplines and fields, including marketing (Wedel & Pieters, 2007), communication sciences (King et al., 2019), tourism (Scott et al., 2019), driver's license exams (Kapitaniak et al., 2015; Liu et al., 2024), linguistics studies (Qin & Zhang, 2024), aviation industry (Ziv, 2016), medicine and health care (Falck-Ytter, Bölte, & Gredebäck 2013; Leveque et al. 2018), psychology (Mele & Federici 2012), engineering (Sharafi et al., 2015), information retrieval (Busher et al., 2012) and education (Strohmaier et al., 2020).

The literature review conducted examined articles published in the Web of Science and Scopus databases. The selected databases include publications which are high-impact factors and offer searching features using various parameters. Conducting the literature review, each database was searched using keywords and phrases, including "human-computer interaction," "eye tracking" and "education", thus creating a foundational understanding of the place and importance of eye-tracking technology in education. After a comprehensive search was conducted with keywords without any date restrictions, followed by a limitation between 2014 and 2024. A total of 283 articles were examined in the databases between 2014 and 2024 to observe the place of eye-tracking technology in the last decade. The search was conducted with the determined keywords, and only articles directly addressing the use of eye-tracking technology in education were evaluated with the in-depth examination of article titles, abstracts and keywords. At the first elimination, 148 of the articles met the criteria and were analysed in detail.

The study reveals that the use of eye-tracking technology in educational processes has become an important tool. When the distribution of the selected articles is examined by year as an answer of the RQ1, it is seen that while the number of publications was low in 2014, there was a high rate of increase with a break in 2018. This increase can be explained by the recognition of the potential of eye-tracking technology and big data and the direction of research in this area in education. In 2020 and after, with the Covid 19 pandemic causing a global increase in educational technologies, it is seen in the literature that there has been an increase in the use of eye-tracking technologies in education. The articles analysed within the scope of the

literature review show that the use of this technology is of critical importance in understanding the attention areas and learning processes of students, evaluating the effectiveness of educational materials and improving educational strategies. The analysis of the citation numbers of the studies to answer RQ2, examined confirms have a wide impact on the academic environment and that the role of eye-tracking technology in education is increasing. The use of eye-tracking technology is seen as a valuable tool to improve the quality of education. All findings indicate that the use and implementation of eye-tracking technology in the field of education can be adopted more widely in future studies.

Factors Influencing the Use of Cryptocurrency Exchanges in Türkiye

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Key Words: Cryptocurrency exchange, Technology acceptance model, Binance

In recent years, cryptocurrency usage and trading have surged, with market capitalization reaching approximately $2.3 trillion by August 2024 (CoinMarketCap, 2024). Several studies, such as those by Schaupp and Festa (2018), Shahzad et al. (2018), and Alharbi and Sohaib (2021), have explored factors influencing cryptocurrency acceptance. While there is extensive literature examining factors influencing cryptocurrency adoption, studies investigating the use of blockchain-based applications are limited. Albayati et al. (2020) and Albayati et al. (2021) investigated factors influencing the use of blockchain-based cryptocurrency transfers and wallets using the extended Technology Acceptance Model (TAM). Our literature review revealed a lack of studies examining the technological acceptance factors of cryptocurrency exchanges. To address this gap, our research investigates the factors influencing the use of cryptocurrency exchange applications. This study employs the extended TAM to analyze factors such as perceived usefulness, ease of use, subjective norms, perceived cryptocurrency risk, regulatory support, privacy, and security, and their effects on behavioral intention and actual usage of cryptocurrency exchanges. As far as our knowledge extends, this is the first study to explore the factors affecting the use of cryptocurrency exchanges.

A survey was conducted with 155 users of the Binance cryptocurrency exchange in Türkiye, and hypotheses were tested using multiple regression analysis with IBM SPSS Statistics 25. Most participants were male (72.26%), with the majority aged 30–39 (47.74%) and holding a university degree (62.58%). Regression analysis revealed that privacy ($\beta = 0.372$, $p < 0.001$),

security ($\beta = 0.258$, $p < 0.001$), regulatory support ($\beta = 0.191$, $p < 0.001$), and perceived usefulness ($\beta = 0.154$, $p < 0.001$) significantly and positively influenced behavioral intention, explaining 79.4% of its variance. However, perceived ease of use ($\beta = -0.012$, $p = 0.341$) and perceived risk ($\beta = -0.014$, $p = 0.892$) did not have a statistically significant effect on behavioral intention. Furthermore, the findings show that behavioral intention ($\beta = 0.873$, $p < 0.001$) strongly predicts actual usage, accounting for 70.1% of its variance. Moreover, perceived ease of use ($\beta = 0.487$, $p < 0.001$) and subjective norms ($\beta = 0.320$, $p < 0.001$) significantly affect perceived usefulness, explaining 69.3% of its variance. Additionally, subjective norms ($\beta = 0.850$, $p < 0.001$) significantly predict perceived ease of use, accounting for 57.9% of its variance.

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From Interaction to Integration: How Emerging Technologies are Transforming Human-Computer Relationships

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Key Words: Technology Management, Human-Computer Interaction, Conversational AI, Zero UI, Personalization, Brain-Computer Interface

The advent of emerging technologies such as Zero User Interface (Zero UI), Personalization, Conversational Artificial Intelligence (AI), and Brain-Computer Interfaces (BCIs) is reshaping the field of human-computer interaction (HCI), moving toward a paradigm of human-computer integration. By minimizing reliance on traditional interfaces, tailoring experiences to individual users, enabling natural language communication, and introducing direct neural interaction, these technologies make interactions more intuitive and seamlessly integrated into everyday activities. This conceptual review examines how these technologies collectively drive this transformation by exploring their distinct roles and implications for users and society. It addresses challenges and ethical considerations and proposes future research directions in HCI.

Improving the Attributes of Generative Artificial Intelligence Applications for Meaningful Learning Experiences

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Key Words: Artificial intelligence, AI in education, Generative AI for learning

Artificial intelligence (AI) is the common name of technological applications that simulate or imitate human brain to carry out certain functions. These functions mostly involve cognitive and behavioral operations while some affective ones are also possible. This means that typical AI applications rely heavily on knowledge and skills in their functioning but they are weak when it comes to feelings and attitudes. Although generative AI applications have become very popular in recent years, they have a variety of features that need to be improved from the point of human-computer interaction for providing meaningful learning experiences for all learners. Most AI tools function based on identifying patterns or recognizing algorithms; they do a poor job in heuristic tasks which are unexpected or unexposed. Therefore, "machine learning" as a common practice of AI in education is not really learning but pattern-recognition. They cannot go beyond analyzing, connecting or synthesizing data to generate a particular response; they are virtually dependent upon the information produced by humans as well as other information agents. They are unable to create original knowledge or invent something new which are totally unprecedented because they do not have the critical thinking ability as human do; this feature eventually makes them generative at best rather than innovative. Typical AI applications do not tell the truth that they do not know the answer to a question; instead, they make up the most-likely response which may not even be true. How misleading they may be! They don't respect the intellectual rights of creators of knowledge, they don't even bother to indicate the source of information they share so that they are blood-suckers in a way. Many of them maintain route-learning or low-level tasks rooted in behaviorism and they are weak in supporting alternative realities or

high-level tasks that involve constructivism, when in fact educators in all around the world need intelligent systems supporting advanced learning in any domain. These are only a few of the common pitfalls of generative AI applications in education. However, all these features have detrimental effects on learning, which ultimately decreases the effectiveness, appeal, and efficiency of educational experiences. This paper discusses what needs to be done to overcome such widespread shortcomings of current generative AI applications to provide empowering learning experiences that satisfy learners. The paper also highlights the desired attributes of generative AI applications in human-computer interaction which will improve the meaningfulness of educational practices in the future.

İnsan Bilgisayar Etkileşiminde Karbon Salınımına Çözüm Önerisi: Yeşil Yapay Zekâ

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Key Words: Yeşil yapay zeka, İnsan bilgisayar etkileşimi, Karbon salınımı

Teknolojinin gelişmesiyle birlikte insanların günlük hayatında her alanda bilgisayar ile etkileşimi oldukça fazladır. Günümüzde insan bilgisayar etkileşimi (HCI), son dönemlerin yoğun ilgi gören yapay zekâ teknolojilerinin kullanımıyla, önemli miktarda karbon salınımına neden olmaktadır. Bu durum, iklim değişikliği ve çevresel sürdürülebilirlik açısından ciddi bir tehdit oluşturmaktadır. Yapay zekâ araçlarıyla hazırlanan her bir görsel içerik, bu araçlara girilen her bir istem (prompt), kullanıcıların arka planda görmedikleri işletim sistemlerinin çalışması için daha fazla enerji gerektirir. YZ teknolojilerini geliştirmek ve kullanıcının istediği yüksek kalitede içerik oluşturabilmek için daha fazla veri seti ve bilgisayar donanımlarına ihtiyaç vardır. Artan yüksek kaliteli YZ kullanımı, HCI kaynaklı karbon salınımını da arttırmaktadır. Dolayısıyla, HCI'nın karbon ayak izini azaltmak ve daha sürdürülebilir bir gelecek inşa etmek için acil çözümler gerekmektedir. Bu çalışma, HCI süreçlerinin enerji tüketimi ve karbon salınımı üzerindeki etkilerini incelemekte ve bu etkileri azaltmak için yeşil yapay zekâ teknolojilerinin potansiyel çözümlerini değerlendirmektedir. Araştırmada, düşük enerjili algoritmalar, enerji tasarruflu donanımlar ve veri işleme optimizasyonları gibi yeşil yapay zekâ uygulamalarının karbon ayak izini nasıl azaltabileceği tartışılmaktadır. Ayrıca, sıfır karbon salınımına sahip şirketlerden vaatlerini gerçekleştirme süreçleri ve bu süreçlerde izledikleri yollardan bahsedilmiştir. Araştırma doküman analizine dayalı derleme bir çalışma olup, ilgili literatür ve dokümanlar sistematik olarak taranmıştır. Çevrimiçi akademik veri tabanları (Google Scholar, IEE Xplore, SpringerLink, ScinceDirect vb.), üniversite kütüphaneleri ve sektörel yayın platformları kullanılarak arama yapılarak verilerin geçerliliği sağlanmıştır. Çalışmanın bulguları, yeşil yapay zekanın HCI süreçlerinde sürdürülebilirlik sağlama

konusundaki kritik rolünü vurgulamakta ve bu alandaki uygulamaların genişletilmesine yönelik öneriler sunmaktadır. HCI'da son dönemlerde oldukça payı olan yapay zekanın karbon salınımını azaltmak, sürdürülebilirliğe destek sağlamak için yeşil yapay zekâ yaklaşımı göz ardı edilemez durumdadır. Büyük veri setlerinin eğitimde makine öğrenimi ve derin öğrenme kullanımı, hiper parametrelerin ayarlanması enerji verimliliğini artırarak karbon salınımını önemli ölçüde arttırmaktadır. Çevresel sürdürülebilirlik ve enerji verimliliği sağlanabilmesi amacıyla hükümetler ve özel sektör için önerilen politika ve düzenlemeler yapılmalıdır. 'Yeşil yapay zekâ' yeni bir yaklaşım olmasına rağmen yapılan araştırmalar umut vaat edicidir.

İnsan-Bilgisayar Etkileşimi ve Kullanılabilirlik: Lise Web Sitelerinin Kullanılabilirlik Açısından İncelenmesi

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Key Words: Okul web siteleri, kullanılabilirlik, uzman temelli değerlendirme

Bu çalışmada, lise kademesinde kullanılan okul web sitelerinin uzman temelli değerlendirme yöntemi esas alınarak kullanılabilirlik açısından değerlendirilmesi amaçlanmıştır. Bu amaçla, http://.....mebk12.tr lise web siteleri 5 farklı uzman tarafından Neilsen'ın sezgiselleri kullanılarak incelenmiş ve değerlendirilmiştir. Millî Eğitim Bakanlığı'na bağlı tüm okulların kurumsallaştırılması amacıyla; Bilgi İşlem Grup Başkanlığı tarafından Türkiye'nin en büyük kurumsal web sitesi projesi olarak isimlendirilen "Okul Web Sitesi Yönetim Paneli" 2012 yılında hayata geçirilmiştir (MEB, 2007). Kullanılan okul internet sitelerinin web sitesi yönetim panelleri bulunmaktadır. Yönetim panelleri sayesinde okullarda görevlendirilen öğretmenler tarafından paylaşım ve güncellemeler gerçekleştirilmektedir. Okul web siteleri farklı birçok yapıya sahip bireyler tarafından kullanılmaktadır. Ayrıca kullanılan okul web siteleri farklı coğrafya, kültür, dil gibi birçok etmenler göz önünde bulundurulmayarak tasarlanmış ve tüm okullarda aynı şekilde kullanılmaktadır. Amacın okulların internet ortamında kurumsal bir yapıya sahip olması için okul web sitelerin dizayn ve tasarımı standartlaştırılmış olsa da kullanıcı çeşitliliği ve bölgesel farklılıklar düşünüldüğünde esnek bir yapıya sahip olması gerekliliği vurgulanmaktadır (Hebebci , & Alan, 2017) Hebebci ve Alan (2017) tarafından MEB'e bağlı okul web sitesi yönetim paneli (MebWeb) sisteminin kullanılabilirlik açısından değerlendirildiği çalışmasında MebWeb projesinin genel olarak kullanılabilir bir yapıya sahip olduğu ancak geliştirilmesi ve düzeltilmesi gereken yerlerin olduğu belirtilmiştir.

Okul Web sitelerinin içeriklerinin bütün öğrenci, öğretmen ve velilere hitap edecek şekilde hem

zengin hem de her türlü zararlı bilgi ve verilere karşı kontrollü olması gerekir. Okul Web siteleri, eğer hedef kitlenin özellikleri göz önünde bulundurularak tasarlanmazsa gün geçtikçe sayfayı ziyaret edenlerin sayısının azalmasına sebep olacağı gibi daha önce ziyaret edenlerin de bir daha ziyaret etmemelerine neden olacaktır. (Varol ve Kubanç, 2012) Oysa okul Web sitelerinin kalitesi, sayfa özellikleri, linkleri, güncellenmesi ve sunduğu birçok olanağın devamlı gelişmesi gerekmektedir (Ergün ve Ergün, 2008). Ayrıca Web sitelerinde yayımlanan içeriğin anlamlı ve kullanılabilir olması için kısa, kolay gözden geçirilebilir ve amaca odaklı olması, bunlara ilaveten kullanıcıların aklındaki sorulara cevap verebilir niteliğe ve kolayca anlaşılabilir yalın bir dile sahip olması gerekir (Nielsen, 2005). Araştırmadan elde edilen bulgular, lise düzeyindeki okul web sitesinin kullanılabilirlik açısından iyileştirmeye ihtiyaç duyduğunu göstermektedir. Özellikle animasyonun karmaşıklığı, içerik yapılandırmasının kullanıcı odaklı olmaması ve erişilebilirlik standartlarının yetersizliği gibi konular ön plana çıkmaktadır. Bu doğrultuda, web sitelerinin kullanılabilirliklerini artırmak için çeşitli öneriler ve tasarım yönergeleri sunulmuştur. Ara yüz tasarımı ve estetik bakımından birçok web sitesi modern ve çekici bir tasarıma sahipken, bazı sitelerde görsel karmaşa ve estetik açıdan yetersizlikler gözlemlenmiştir. Kullanıcı dostu ve sade tasarımlar, kullanıcıların sitede daha rahat gezinmelerini sağlarken, aşırı karmaşık ve yoğun grafikler kullanıcı deneyimini olumsuz etkilemiştir. Navigasyon ve erişilebilirlik olarak iyi yapılandırılmış menüler ve açık navigasyon yolları, kullanıcıların ihtiyaç duydukları bilgilere hızlıca ulaşmasını sağlamaktadır. Ancak, bazı sitelerde karmaşık navigasyon yapıları ve yetersiz yönlendirmeler nedeniyle kullanıcıların istedikleri bilgiye ulaşmakta zorlandıkları görülmüştür. Sonuç olarak, lise düzeyindeki okulların web sitelerinin kullanılabilirliklerinin artırılması, öğrencilerin eğitim materyallerine daha etkili ve kolay bir şekilde erişmelerini sağlayabilir ve genel öğrenme deneyimlerini olumlu yönde etkileyebilir.

Integrating Universal Acceptance in Human-Computer Interaction for Multilingual Inclusivity

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Key Words: Universal Acceptance, Multilingual Internet, Multilingual Interfaces, Software Design, Digital Inclusion, User-Centered Design, Educational Curriculum

The exponential growth of the internet and digital technologies has led to an increasingly diverse global user population, covering a wide array of languages, scripts, and cultural contexts. This diversity necessitates the adaptation of not only internet infrastructure but also software interfaces and databases to support a truly multilingual environment. Universal Acceptance (UA) provides a framework addressing this challenge by ensuring that all valid domain names, email addresses, and user interfaces—regardless of language and orthography—are correctly recognized and processed by all internet-enabled applications, devices, and systems. This article presents the technical underpinnings of UA, including support for Internationalized Domain Names (IDNs), Email Address Internationalization (EAI), and multilingual software interfaces and databases. We examine how these components integrate into existing internet and software infrastructures and explore their alignment with key principles in Human Computer Interaction (HCI), such as accessibility, and user-centered design. By facilitating interactions in users' native languages and scripts, UA not only enhances the user experience but also promotes digital equity and social inclusion. We argue that the HCI community, along with software designers and engineers, plays a pivotal role in advancing UA by incorporating its principles into research, design practices, and technological development. The paper also discusses the critical role of academia in disseminating UA knowledge, proposing curricular frameworks for integrating UA concepts into computer science, software engineering, and HCI education. This educational integration prepares future professionals to create inclusive technologies that effectively serve

a global audience. Such adoption is essential for building internet technologies and software applications that are accessible, user-friendly, and inclusive for all, regardless of linguistic or cultural background.

Investigating the Gender Effect on Skill-Based Task Performance: A Case-Study on Mobile- and Haptic-Controlled User Interfaces

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Key Words: Virtual simulators, gender differences, classification

As endoscopic surgery provides several benefits for the patient, today they are becoming popular. However, these surgical procedures require the surgeon develop several skills which is a challenge for the surgical education programs. In order to support surgical education today computer-based simulation environments are providing very promising results. The gender effects have been analyzed in these environments and earlier studies have reported some gender differences. However, there is no consensus in the literature about the gender effect for endoscopic surgery training programs. There are very few female surgeons in this field. This might be one of the reasons of these limited studies. Accordingly, this study aims to better understand the gender effect on two platforms namely haptic controlled PC environment (PC) and mobile environment. For this purpose, a scenario is designed for the introduction to the endoscopic surgery procedures. The main objective of the scenario is to improve the necessary skills of the surgical residents such as depth perception, 2D and 3D conversions and eye-hand coordination. A bone like object is developed and the users are asked to drill the points in these objects by using a tool. This scenario is developed as two versions one is controlled by a haptic device and the other

is controlled by finger. In total 77 university students (37 female, 40 male) were voluntarily participated in this study. Their performances in the simulation environment by considering the time spent and the accuracy of the assigned tasks analyzed for the left- and right-hand. The result of this study indicates some significant performance differences of between male and female in mobile environment, whereas no significant differences seen in haptic-based environment. Male performed the task in a shorter time, with higher accuracy in mobile environment. Additionally, classification algorithms is used to understand the gender effect. The highest accuracy obtained is 80.52

Kyrgyz Adaptation of the Smartphone Addiction Inventory Scale

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Key Words: Smartphone, addiction, scale adaptation, SPAI, students

The aim of this study is to determine the reliability and validity of the Kyrgyz form of Smartphone Addiction Inventory (SPAI) Scale.The original form of the SPAI scale is in English and involves 26 items under four dimensions: functional impairment, withdrawal, compulsive behavior, and tolerance. In this study, the SPAI scale was translated into Kyrgyz and field experts conducted the appropriate checks. Validity and reliability of the SPAI scale was performed in a state university of Kyrgyzstan.For the exploratory factor analysis, data of 207 students were utilized and for the confirmatory factor analysis data of 202 students were utilized. Factors were identified with respect to the results of the exploratory factor analysis. Confirmatory Factor Analysis was conducted to verify the construct validity of the Kyrgyz form of the scale. The reliability of the scale was confirmed through the estimations of Cronbach Alpha internal consistency coefficients. The internal consistency coefficient of the scale was confirmed. With respect to the analyzes performed in the study, the validity and reliability of the Kyrgyz version of the SPAI scale were verified. According to the results of the present study, the Kyrgyz form of the scale consisted of 4 factors and 25 items. This study is one of the initial ones with the purpose of investigating smartphone addictions of Kyrgyz university students.

Marketing AI Interaction and Environmental Risks: Carbon Footprint Issue Beyond Benefits

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Key Words: Marketing - Artificial Intelligence interaction, AI – society interaction risks, carbon footprint

As artificial intelligence (AI) continues to significantly impact society, this study evaluates the marketing-AI interaction by examining AI applications in the marketing sector. It focuses not only on the benefits but also on the environmental costs and potential carbon footprint of AI and its tools. The starting point of this study is the recognition of AI-society interaction risks, including the potential for AI to become a part of the climate problem, alongside its positive impacts on large-scale problem-solving and sustainability in marketing sector. AI is largely seen as an alternative solution to climate change, with ecological costs perceived as less significant. These findings suggest a widespread lack of awareness regarding the interaction between AI and environmental sustainability. This issue may be overlooked in the sector. Areas where AI is seen as a solution include: a) the integration of renewable energy, b) reducing carbon costs through the development of new tools, and c) supporting environmental sustainability. However, considering the energy requirements of AI and the tools developed through it, the environmental costs can be significant and beyond what is readily apparent. This study is conducted through a comprehensive literature review to examine the interaction of AI in the marketing sector and environmental risk by reviewing scientific articles, reports, and sectoral analyses. Based on this data, a conceptual evaluation aimed at raising awareness of the environmental impacts of AI in marketing applications is conducted. The literature review provides a framework to understand both the marketing-AI interaction and the potential negative impacts of these technologies on sustainability, offering pathways for future considerations. The study identifies

potential risks associated with the use of AI in the marketing sector—a sector with high impact on sustainability—including (1) increased energy requirements, (2) carbon budget, (3) the inter-organizational integration process, and (4) the lack of transparency and reporting on emissions.

Medical Doctors' Communication with AI: UK Sample

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Key Words: Communication, AI, Medical Doctors

The integration of Artificial Intelligence (AI) in healthcare has transformed medical practices, especially in terms of communication between medical doctors and AI systems. This study examines the dynamics of this interaction within the context of UK's healthcare system. It explores how AI tools are being utilized by doctors to enhance diagnostic accuracy, treatment plans, and patient management. The study highlights medical doctors' perception and experiences about the benefits of AI, such as increased efficiency and improved patient outcomes, while also addressing challenges like data privacy concerns, the need for specialized training, and the potential for over-reliance on technology. This research is designed the second part of the study that conducted in Turkey 2021-2022 with Turkish Medical Doctors. 20 Turkish Medical Doctors working in UK participated to the study and they were asked about the communication, concerns and potential benefits and malpractices of Medical AI. According to the data obtained from depth interviews with Turkish Medical Doctors in UK, they have much more less stress and anxiety than Turkish Medical doctors working in Turkey. Moreover, Turkish Medical Doctors in UK feel much more comfortable communicating with AI compared to the medical doctors in Turkey.

Merging ChatGPT with Minecraft: AI Chatbots for Enhanced User Engagement and Learning

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Key Words: AI, Artificial Intelligence, Gaming, Minecraft, Language Learning, Technology Integration, Education, Language Acquisition, Gamification

The increasing popularity of Artificial Intelligence (AI) in games for educational purposes (Chen et al., 2020) has prompted this study to explore the effects of integrating AI and gaming elements within the popular game Minecraft on language learners' attitudes. Due to the difficulties schools face in maintaining students' interest and motivation, gamification—the practice of introducing game features into non-gaming contexts—has become increasingly popular (Saleem, Noori, and Ozdamli, 2022). While gamification is acknowledged for increasing the enjoyment and engagement of learning (Hammer and Lee, 2011), the psychological processes regulating player-AI communication have received less attention than game mechanics and outcomes (Dindar et al., 2021). The integration of AI non-player characters (NPCs) in educational games offers a way to address this gap by providing personalized language instruction and generating authentic language materials, which might altogether affect learners' engagement and language acquisition (Reinhardt & Kirby, 2022). Despite the potential of AI NPCs to create a stress-free learning environment and cater to shy learners (Dokukina and Gumanova, 2020; Jeon et al., 2023), there is limited research on their effectiveness in language learning scenarios. A literature review by Yunanto, Herumurti, Rochimah, & Arifiani (2021) found that most educational games lacked NPCs and specific learning strategies, highlighting a need for self-sufficient learning experiences powered by AI and games. Additionally, Lin et al. (2020) inspected 2,228 Minecraft mods on the CurseForge platform and identified five categories of mod characteristics. While NPCs were popular, AI-backed NPCs were still missing.

This study investigates the impact of an AI-driven Minecraft mod that learners install, focusing on how these technologies influence language acquisition and the perceptions of participants regarding their effectiveness in improving English language skills. The study involves two groups with at least an A1 level of English proficiency, who engaged in AI-supported modded Minecraft gameplay for a minimum total of 4 hours, with playtime distributed over a month. Data was collected through surveys, pre-post tests, semi-structured interviews, and analysis of prompts generated during gameplay. Initial findings indicate a positive impact on language practice and overall gaming experience. However, due to the limited exposure time, significant changes in language skills may require longer gameplay periods. The study suggests that AI and gaming integration has the potential to enhance language learning, highlighting the need for further research to optimize these technologies for language education.

Mind and Machine: Neuroscience of HCI

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Key Words: Brain-Computer Interfaces, Human-Computer Interaction, Electroencephalography, Neural Signal Decoding, Machine Learning, Motor Learning, Electrocorticography

The fusion of neuroscience and human-computer interaction (HCI) has driven notable progress in brain-computer interfaces (BCIs), enabling direct communication between the brain and external devices without requiring physical movement. This paper explores the intersection of BCIs and HCI, highlighting how advanced neuroscience methods like electroencephalography (EEG), functional magnetic resonance imaging (fMRI), magnetoencephalography (MEG), and electrocorticography (ECoG) are used to enhance interactions with digital systems. It examines current approaches and shows how these technologies are applied to create systems that are both adaptive and intuitive, responding effectively to users' cognitive and emotional states. A major focus of the paper is an experimental study comparing the effects of visual feedback alone versus combined visual and haptic feedback on motor learning and cognitive workload. The findings indicate that while haptic feedback aids motor learning and reduces errors, it also increases cognitive workload, adding more mental strain on users. This dual impact underscores the potential and challenges of integrating brain-inspired computing with HCI, suggesting a need for further research to refine these technologies and address related ethical concerns. The paper discusses how recent advances in signal processing and machine learning are improving BCI applications. Techniques like Principal Component Analysis (PCA), Fast Fourier Transform (FFT), and deep learning models such as Convolutional Neural Networks (CNNs) are enhancing EEG data interpretation, leading to more accurate and real-time applications like emotion recognition and cognitive load assessment. fMRI remains crucial for its high spatial resolution in brain activity mapping, while MEG provides a useful balance of spatial and temporal resolution.

The paper also looks into ECoG's role in high-resolution data collection, especially for speech and motor control. This research highlights the transformative potential of integrating neuroscience with HCI, aiming to create more responsive, inclusive, and intuitive human-computer interactions. Despite significant advancements, the study points out the ongoing need to tackle challenges such as improving signal quality, managing complex data, and addressing ethical issues related to brain data. As these technologies develop, they have the potential to revolutionize digital interactions, making them more seamless and tailored to individual needs.

Öğretmen Adaylarının Yaşam Boyu Öğrenme Eğilimleri, Bilişsel Esneklikleri ve Bilgisayarca Düşünme Becerilerinin İncelenmesi

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Key Words: Anahtar Kelimeler: Bilgisayarca Düşünme, Bilişsel Esneklik, Yaşam Boyu Öğrenme.

Bu nicel ilişkisel tarama modelinde gerçekleştirilen araştırmada öğretmen adaylarının yaşam boyu öğrenme eğilimleri, bilişsel esneklikleri ve bilgisayarca düşünme becerileri, bu değişkenler arasındaki ilişki ve bu ilişkilerin yordayıcılarının belirlenmesi amaçlanmıştır. Eğitim Fakültesi birinci ve dördüncü sınıfta öğrenimine devam eden 675 öğrenci ile bu fakültede Pedagojik Formasyon eğitimi alan 443 öğrenci olmak üzere, toplam 1118 öğrenci bu araştırmanın örneklemini oluşturmuştur. Araştırmada veri toplama aracı olarak, Diker (2009) tarafından geliştirilen ”Yaşam Boyu Öğrenme Eğilimleri Ölçeği”, Dennis ve Vander-Wal (2010) tarafından geliştirilen, Sapmaz ve Doğan (2013) tarafından doğrulayıcı faktör analizi yapılarak Türkçeye uyarlanan ”Bilişsel Esneklik Envanteri”, Korkmaz, Çakır ve Özden (2017) tarafından geliştirilen ”Bilgisayarca Düşünme Becerileri Ölçeği” kullanılmıştır. Verilerin analizi için SPSS 23.0 veri analiz programı kullanılmış, Kruskal Wallis H ve Mann Whitney U testleri yapılmıştır. Bulgulara göre, öğretmen adaylarının yaşam boyu öğrenme eğilimleri, bilişsel esneklikleri ve bilgisayarca düşünme becerileri; cinsiyet, sınıf ve mezun oldukları lise türü değişkenlerine göre anlamlı farklılıklar göstermektedir. Kadınların, erkek öğretmen adaylarına göre yaşam boyu öğrenmeye yönelik eğilimleri daha yüksekken, bilişsel esneklik düzeylerinde erkekler lehine anlamlı bir farklılık gözlenmiştir. Ayrıca pedagojik formasyon eğitimi alan öğrencilerin yaşam boyu öğrenme eğilimleri ve bilişsel esneklikleri, eğitim fakültesinde öğrenim gören öğretmen adaylarına kıyasla daha yüksek düzeydedir. Bilgisayarca düşünme becerileri alt boyutlarından eleştirel düşünme ve algoritmik düşünme erkek öğretmen adayları yönüne, yaratıcılık alt boyutunda ise kadın öğretmen adayları lehine daha yüksektir. Öğretmen adaylarının sınıf düzeyleri arttıkça, yaşam boyu öğrenme eğilimleri, bilişsel esneklikleri

ve bilgisayarca düşünme becerileri de artmaktadır.

Overcoming Barriers Through AI in Visual and Video Design: A Case Study

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Key Words: Human AI Interaction, Digital Communication, Social Inclusion, Semiotics, Film Language

Artificial Intelligence (AI) has played a crucial role in human life and has been evolving at a tremendous speed making human computer interaction possible. Today, AI is used by people all around the world, each with different needs. It provides equal and inclusive opportunities for people with disabilities. The current study is based on a case study design investigating an undergraduate student with a disability and how his interaction with AI enables him to use his creativity in his designs. Semi structured in-dept face-to-face and online interviews were conducted with the student, examining his interaction with AI from the first day until today, facilitated only by verbal prompting, and exploring how he has built and developed his relationship with AI in his social, academic and professional life. The case study also involves a semiotic analysis of the student's 2 videos and 2 visual designs selected through purposeful sampling. The semiotic analysis was conducted through Roland Barthes's "five systems of meaning" aiming to reveal the communication between the student, AI and the audience through the meaning constructed in the student's narratives. The study demonstrated how AI helped the

student with disability discover and use various AI tools in his designs while creating meaning in the narratives. The semiotic analysis revealed the use of enigmatic, connotative, proairetic, symbolic and cultural codes among Barthes's "five systems of meaning". This study provides insights into human-AI interaction, offering opportunities for social inclusion, while shedding light on film language incorporating theoretical knowledge with AI.

John McCarthy, who used the term artificial intelligence at the Dartmouth Conference in 1956, defined artificial intelligence as the ability of a machine to perform tasks that require human intelligence. Artificial intelligence, which has the ability to perform cognitive functions like humans, emerges as a productive technology today. Productive artificial intelligence plays a transformative role in visual design by providing new forms of collaboration between artificial intelligence systems. The integration of AI tools into visual design processes has significantly expanded the possibilities for users to be creative. In particular, it encourages designers to create higher-level designs as it performs various design options such as drawing, color, typefaces, and layout more quickly and practically (Ardhianto, 2023; Hughes et al., 2021). In addition, artificial intelligence tools such as DALL-E 3, Midjourney, and Stable Diffusion have also accelerated the creative process by generating high-quality visual and auditory designs from text descriptions (Chen, 2024). In this context, it is important to use semiotic analysis to understand both the symbolic representations and the construction of meaning in the narrative of AI tools used in design creation processes.

Punctuation Restoration Using Transformer Model for Kyrgyz Language

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Key Words: XML-ROBERTa-base model, ROBERTa- base model.

The process of developing and training a model to address the punctuation issue in the Kyrgyz language was multifaceted, encompassing various crucial stages that collectively contributed to achieving commendable outcomes. Initially, a meticulous assessment of existing models and methodologies pertinent to punctuation problem-solving was conducted. This evaluation revealed a prevalent focus on English-centric approaches, which often yielded suboptimal outcomes when applied to less common languages like Kyrgyz.

In light of these findings, the decision was made to leverage a multilingual pre-trained model based on XML-ROBERTa. This selection was substantiated by the model's demonstrated efficacy when trained on datasets containing Cyrillic characters. Furthermore, it was noted that incorporating multilingual data significantly enhanced the model's contextual comprehension, particularly in the Kyrgyz language domain.

The acquisition and curation of training and testing datasets constituted another pivotal phase of model development. These datasets were meticulously collated from a diverse array of sources, including literary works, Wikipedia entries, and Kyrgyz-language websites. This comprehensive dataset facilitated robust model training and validation processes.

An intrinsic advantage of the chosen model lies in its versatility in processing text across different languages, including Kyrgyz. Despite the fact that the ROBERTa-base model employed in this study isn't explicitly tailored for punctuation tasks, its architectural design and pre-training on

multilingual corpora render it proficient in punctuation prediction tasks, even in the Kyrgyz language context.

Empirical experiments and thorough analyses underscored the efficacy of the model derived from the multilingual pre-trained ROBERTa architecture, showcasing superior accuracy and performance in addressing the punctuation challenge specific to the Kyrgyz language. This affirmation reaffirms the efficacy of employing pre-trained models in addressing linguistic challenges within underrepresented languages, highlighting their adaptability to diverse linguistic nuances and contextual intricacies.

By prioritizing multilingualism and leveraging advanced pre-trained models, this endeavor not only addresses the immediate need for improved punctuation solutions in the Kyrgyz language but also contributes to the broader discourse on the utility of AI-driven approaches in fostering linguistic inclusivity and accessibility.

Strategies for Mitigating Computer-Based Interruptions for Software Developers

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Key Words: Computer-Based Interruptions, Task Performance, Notification Management, Pomodoro Technique

In today's competitive software development environment, a software developer needs to focus on their work with great attention and care to deliver a software product with minimal or no errors. User interruptions refer to interventions that distract a user or disrupt their workflow while they are engaged in a specific task. These interruptions are often computer-based and originate from various communication tools such as instant messaging, file sharing, and video calls. These tools play a significant role in both professional and personal interactions, and their usage is continuously increasing. However, if these interactions are not properly coordinated, interruptions during tasks can lead to decreases in task performance and focus. Time management plays a critical role in mitigating the negative effects of these interruptions. Strategies such as using time effectively, setting priorities, and organizing tasks help maintain a balance in both work and personal life. In this study, a two-week experiment involving 12 participants was conducted to examine the effects of interruptions on developers and to manage these interruptions using the Pomodoro Technique known for its effectiveness in time management. There was a statistically significant positive correlation between the absence of the Pomodoro technique and an increased number of errors made by software developers (p- value = 0.038). The study showed that by using the Pomodoro technique to reduce the number of distracting interruptions, developers' error rates decreased.

SWOT Analysis of Digital Education System

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Key Words: Digital Education System, smart classrooms, SWOT Analysis

The article explores the impact of the Digital Education System (DES) on the relationship between humans and computers, presenting a balanced approach focusing on both its advantages and disadvantages. The main emphasis here is on the integration of digital tools such as smart classrooms to transform traditional teaching environments. The article also discusses the evolution of digital classrooms, including the use of smart boards, online collaboration tools, augmented reality (AR), virtual reality (VR), and the flipped smart classroom model. Furthermore, the author presents their approach to SWOT Analysis of DES. At the same time, the author's approach to SWOT Analysis of DES is presented. This approach aims to explore in depth the technological advancements and their implications in education: It analyzes the current trends and technologies of DES, exploring their impact on the smart learning environment. The approach also contains expert recommendations for comparing the results obtained through continuous monitoring to assess the effectiveness of DES. Through SWOT Analysis, the following are identified: Strengths: In addition to ensuring significant advantages of DES, it offers economic efficiency, innovative opportunities, and global accessibility methods. DES reveals that it creates extensive opportunities for the agile implementation of knowledge, as well as supports new

conseptions in the knowledge-based digital economy. İn addition, DES facilitates immersive learning experiences and enhances the conceptual approach through advanced smart tools and methods. Weaknesses: Particularly highlighted is the attention to cybersecurity issues such as digital security problems, dependence on reliable internet services, potential risks related to electronic transactions and system protection. Opportunities: The new approach motivates the integration of DES into global cyber-training programs. It offers opportunities to align with global trends, as well as to assess and compare development and improvement methods in this direction. Threats: The approach considers potential risks, including cybersecurity threats, system functionality issues, digital divide disparities, and dependence on the internet.

In conclusion, while technology-based learning environments offer numerous benefits, it is emphasized that the effective use of them is dependent on the recognition of appropriate teaching methods. Digital classrooms and smart teaching systems create a bridge between digitization and digital transformation, enhancing the inclusivity and learning abilities of students; interactive learning platforms, brings forward the application of technological innovations in education, such as superior collaboration with AR, VR and smart tools. The article emphasizes the importance of modernizing education and preparing students for future challenges through the wide promotion of DES, as well as the need for sustainable development, sufficient technical measures and addressing digital security and access issues.

Texnologiyanın turizmə təsiri: Metaverse turizminin gələcək inkişafı

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Key Words: metaverse, immersiv səyahət, turizm, texnoloji infrastuktur

Qlobal turizm mənzərəsi inkişaf etməyə davam etdikcə, turizm istiqamətlərinin tam potensialının üzə çıxarılmasında texnologiyaların çoxşaxəli rolunu başa düşmək getdikcə daha vacib olur. Ağıllı konsepsiya informasiya texnologiyalarının yüksəlişi və davamlılıq ehtiyacı nəticəsində yaranıb. O, əsasən real dünya haqqında real vaxt məlumatlılığını təmin etmək üçün aparat, proqram təminatı və şəbəkə texnologiyalarını birləşdirən informasiya texnologiyalarına və insanlara alternativlər haqqında daha ağıllı qərarlar qəbul etməyə kömək etmək üçün qabaqcıl analitikaya, eləcə də biznes proseslərini optimallaşdıracaq tədbirlərə əsaslanır. Bu texnologiyalar innovasiyaya təkan verir və davamlı inkişafı təmin etməklə yanaşı daha yüksək rəqabət qabiliyyətinə gətirib çıxarır. Turizm informasiya texnologiyalarından çox asılı olduğundan son illərdə bu texnologiyalar səyahət təcrübəsinin və turizm məhsulunun idarə olunmasının strukturuna çox möhkəm bağlanmışdır. Ağıllı turizm informasiya texnologiyalarının təkamülündən təsirlənən turizmin inkişafının hazırkı mərhələsini təsvir edir. Texnologiya istiqamətləri müasir səyahətçilərlə rezonans doğuran immersiv məzmun və təcrübələr təklif etməyə imkan verir. Virtual reallıq (VR) və genişlənmiş reallıq (AR) texnologiyaları səyahətçilərə məkanları virtual olaraq kəşf etməyə imkan verir və çatdıqdan sonra onları nə gözləyə biləcəyinə dair ön baxış təqdim edir. İnteraktiv xəritələr, 360 dərəcə videolar və canlı yayım imkanları səyahətçilərin təcrübəsini daha da artırır və onlara yeni və maraqlı üsullarla təyinat yerləri ilə əlaqə saxlamağa imkan verir. Daha sonra texnologiya istiqamətləri səyahətçi seçimləri, davranışları və tendensiyaları ilə bağlı dəyərli məlumatlarla təmin edir. Məlumat analitikasından və süni intellektdən (AI) istifadə etməklə, təyinatlar hədəf auditoriyasını daha dərindən başa düşə və marketinq strategiyalarını buna uyğun olaraq uyğunlaşdıra bilərlər.Bu məqalədə texnologiyaları və turizm potensialından səmərəli istifadə

arasındakı mürəkkəb qarşılıqlı əlaqəni araşdırmağa, rəqəmsal infrastruktur, məlumat analitikası, süni intellekt və digər inkişaf etməkdə olan texnologiyaların turizm təcrübəsini necə dəyişdirdiyini araşdırmağa çalışırıq. Məqalədə metaversenin turizm sahəsinə transformasiyası nəticəsində rəqəmsal vasitələrlə səyahət təcrübəsi araşdırılır. Xüsusən virtual reallıq (VR) və artırılmış reallıq (AR) immersiv səyahətdə hərəkətverici qüvvələr kimi vurğulanır. Metaverse-də məşhur turizm məkanlarının simulyasiyası coğrafi maneələri aradan qaldıraraq fiziki səyahət olmadan mədəni təcrübə imkanları yaradır. Sərhədsiz səyahət, zaman və məkan məhdudiyyətlərinin aradan qaldırılması metaverse turizmin əsas üstünlüyü kimi qeyd edilir. Müsbət tərəfləri əldə etmək üçün güclü texnoloji infrastruktur, hüquqi və etik məsələlər öz həllini tapmalıdır. Məqalədə gələcək inkişaf perspektivləri, yeni iş imkanları, iqtisadi təsirlər və metaverse turizmin ekoloji təsirləri də araşdırılır.

Ticari Oyunların Eğitimde Kullanımının Etkileri Üzerine Araştırma Eğilimleri

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Key Words: Ticari Oyunlar, Oyun Tabanlı Öğrenme, Meta-Analiz

Bu çalışma, 2014-2024 yılları arasında ticari dijital oyunların eğitim üzerindeki etkilerini inceleyen çalışmaları sistematik derleme ve meta-analiz yoluyla analiz etmeyi amaçlamaktadır. Dijital oyunların bir eğlence aracı olmanın ötesinde eğitim süreçlerinde etkili bir araç olduğu çeşitli çalışmalarla desteklenmiştir (Malone, 1980; Selnow, 1984; Yılmaz ve Çağıltay, 1994). Ticari dijital oyunların eğitimdeki potansiyel değerini anlamak, öğrenenlerin motivasyonu, katılımı ve akademik başarısı üzerindeki etkilerini incelemek açısından önemlidir (Talan, Doğan ve Batdı, 2020). Bu amaçla yapılan çalışmada, deneysel yöntemlerle yürütülen 15 makale sistematik taramaya dâhil edilmiş ve bunlardan 8 tanesi meta-analiz için seçilmiştir. Meta-analiz ile elde edilen veriler Hedges'g kullanılarak analiz edilmiş ve ticari oyunların eğitimde kullanımının genel etki büyüklüğü hesaplanmıştır (Borenstein vd., 2009).

Bulgulara göre, ticari dijital oyunlar öğrenme motivasyonunu artırmakta, sosyal becerileri geliştirmekte ve akademik başarıyı yükseltmektedir. Özellikle dil öğrenme, problem çözme ve sosyal etkileşim gibi alanlarda ticari oyunların etkili olduğu görülmüştür (Chen ve Hwang, 2014; Prot vd., 2014). Meta-analiz sonuçları, ticari dijital oyunların öğrenme motivasyonu üzerindeki etkisinin orta düzeyde olduğunu (g=0,55) ve bu oyunların öğrenme süreçlerini daha eğlenceli hale getirerek öğrencilerin katılımını artırdığını göstermektedir (Talan, Doğan ve Batdı, 2020). Ancak ticari oyunların eğitim hedefleri doğrultusunda seçilmesi ve kullanılması başarıyı artırmak için kritik bir faktör olarak kabul edilmektedir (Aksakallı, 2019; Bire, 2019).

Sonuç olarak ticari dijital oyunlar, öğrenme sürecine motivasyon ve etkileşim katan önemli araçlar olarak kullanılabilir. Ancak bu oyunların eğitimde etkili bir şekilde kullanılabilmesi için öğretmenlerin pedagojik bilgilerinin artırılması ve oyunların eğitim hedefleri doğrultusunda seçilmesi gerekmektedir (Yee, 2006). Gelecekteki araştırmalar bu alanda yeni bilgiler sağlayabilir ve ticari oyunların farklı eğitim seviyelerindeki etkilerini inceleyerek eğitim uygulamalarına katkıda bulunabilir. Bu çalışma, ticari dijital oyunların eğitimdeki potansiyelini ortaya koyarak bu alandaki araştırmalar için önemli bir temel oluşturmayı amaçlamaktadır.

University Students' Reception of Biases and AI Hallucination in Artificial Intelligence-Generated Content as a User Experience: An Exploratory Research

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Key Words: Artificial Intelligence, User Experience, Digital Literacy, AI Bias, AI Hallucination

Today, artificial intelligence (AI) confronts us as a phenomenon that has tremendous impacts on every field of the modern world such as education, art, technology, health and industry. Generative AI (Gen-AI) is the most visible and popular form of AI with which ordinary individuals now have the opportunity to use it in many aspects of everyday lives. However, despite all this power of influence, Gen-AI seems to have some limitations. One prominent feature of these limitations can be discussed under the term AI literacy. Features of AI in general, Gen-AI literacy in particular are multifaceted, encompassing issues of accessibility, usability, ethical concerns, and the need for enhanced educational frameworks. It is clear that Gen-AI has become a transformative force across various domains, yet it is not without significant usability and other forms of issues that can hinder user experience and effectiveness. According to the relevant literature, the main usability issues in Gen-AI encompass AI hallucination, the complexity of interaction, integration challenges, and ethical considerations (Shneiderman, 2020; Alsanousi, 2023; Kim, H and Lee, S.W., 2024; Muralidhar, 2024; Alshehri, 2024; Chugh, 2024).

In "AI hallucination," Gen-AI produces outputs that are plausible but factually incorrect or misleading. This issue not only undermines the credibility of AI systems but also complicates user interactions, as users may struggle to discern the reliability of the information provided by these systems (Kim, H and Lee, S.W., 2024, p. 93-94). From this perspective, AI hallucination can also be considered as an ethical issue along with biases which is a prominent part of AI ethics.

AI hallucination can involve generating convincing but completely 'made-up' answers, often fuelled by repeated biases that are pervasive across the web. In our case, AI hallucination and bias are both more intense and have more tangible repercussions in everyday life, they deserve more prioritized interest in the context of Gen AI use and its ethics.

Aim of the study This paper covers sub-problematic and pre-results of ongoing research which aims to understand better and describe the limitations that university students confront while using Generative AI in the context of digital literacy. As one of the major problematics of digital literacy is about media ethics, we started our field research by investigating the major limitations of Gen AI using experience of university students, especially focusing on how they perceive and/or receive the ethical issues and/or how they react to them. As the ethical problems that may occur in this experience are diverse, in this particular study we tried to focus on AI hallucination and bias as the most prominent problematic. So, the aim of this specific paper is to understand and discuss how university students read the biases and AI hallucinations produced by generative artificial intelligence tools in the context of user experience.

Methodology We designed multi-method research by which we tended to understand the students' awareness of bias and AI Hallucination literacy which limit their actual Gen AI usability skills. In order to do this, we constituted a three-phase online form. The first phase involves the implementation of a scale measuring the level of generative AI literacy of university students as a questionnaire. In the second stage, the students were asked to answer the semi-structured questions and to fill out an evaluation form in which we aimed to analyse how they read the images generated by Adobe Firefly and containing three different bias categories (gender, occupation, ethnicity), particularly in the context of bias and AI hallucination, and also their overall user experience.

As a result, the overall conclusion reflects that the students' AI literacy levels were at an intermediate level and that there were literacy limitations in their ability to use these tools, both about this and in relation to the AI tools producing AI hallucination and bias.

Üretken Yapay Zeka Araçlarının Eğitimde Kullanımı: Kullanılabilirlik Perspektifinden Bir İnceleme

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Key Words: Kullanılabilirlik, Üretken Yapay Zeka, İnsan-Bilgisayar Etkileşimi

Eğitimde üretken yapay zekâ tabanlı araçların hızla gelişimi, öğretmenlerin sınıf içi uygulamalarını daha etkili ve verimli hâle getirmelerini sağlamaktadır. Bu çalışmanın amacı, öğretmenler tarafından yaygın olarak kullanılan "Magic School AI," "ChatGPT," "Suno," "Gamma," ve "Canva Magic Studio" gibi üretken yapay zekâ araçlarının kullanılabilirlik düzeylerini değerlendirmektir.

Araştırmada, bu araçların kullanım kolaylığı, karmaşıklık, işlevlerin entegrasyonu, ve kullanıcı güveni gibi faktörler Sistem Kullanılabilirlik Ölçeği (SUS-TR) kullanılarak ölçülecektir. Öğretmenlerin bu araçları kullanırken yaşadıkları deneyimler yaş ve teknoloji beceri düzeyleri açısından analiz edilecektir. Ayrıca, öğretmenlerin bu araçları kullanmalarının önündeki olası zorluklar istatistiksel olarak değerlendirilecektir. Ölçek, öğretmenlerin üretken yapay zekâ araçlarıyla etkileşimlerini anlamaya ve bu araçların geliştirilmesine yönelik öneriler sunmaya yönelik ön araştırma olarak kullanılacaktır.

Usability Evaluation of LinkedIn: A Heuristic and Empirical Analysis

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Key Words: LinkedIn, usability, heuristic evaluation, empirical testing, user experience, Human-Computer Interaction (HCI)

LinkedIn, a globally dominant professional networking platform, has become an indispensable tool for career advancement, professional development, and industry connection. This research delves into a comprehensive evaluation of LinkedIn's usability, focusing on its user interface (UI) and user experience (UX) design through the lens of established Human-Computer Interaction (HCI) principles. The study aims to uncover usability challenges and propose actionable recommendations to enhance the platform's effectiveness.

Employing a multifaceted approach, the research combines heuristic evaluation, based on Nielsen's heuristics, Norman's principles, and Schneiderman's golden rules, with empirical usability testing involving a sample of LinkedIn users. The analysis covers core platform functionalities such as profile creation, networking, job searching, and professional branding.

Key findings from the heuristic evaluation revealed critical usability issues, including overly restrictive mandatory fields during registration, inefficient skill addition processes, lack of profile

templates, and inconsistent search functionalities. Empirical testing corroborated these findings, with participants experiencing difficulties in registration, skill and language input, search accuracy, connection recommendations, and job posting.

The research concludes by emphasizing the need for significant UI and UX improvements in LinkedIn. Specific recommendations include streamlining the registration process, optimizing skill and language management, enhancing search capabilities, refining connection algorithms, and improving job posting clarity. By addressing these areas, LinkedIn can significantly elevate its user experience and solidify its position as a leading professional networking platform. This study contributes to the broader understanding of usability challenges in complex digital environments and provides a practical framework for evaluating and enhancing online platforms.

Uşaqlar üçün Komputer İnterfeyslərinin İnkişafı və Təhsil Üzərinə Təsiri

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Key Words: interaktiv texnologiya, təlim interfeysləri, fərdiləşdirilmiş təlim, rəqəmsal təhlükəsizlik, kompüter

Dünyanın bütün inkişaf etmiş ölkələrində uşaqlar qarşılarında olan əşyaların interaktiv olmasını və istədikləri məlumata sürətlə əlçatanlıqlarının olmasını istəyirlər. Uşaqlar texnologiyanı öyrənib, ondan istifadə etdikləri halda onların öyrənmə, oynama və başqaları ilə ünsiyyət qurma tərzi dəyişir. Kompüterlə qarşılıqlı əlaqənin necə olmasından asılı olaraq yaranan dəyişikliklər uşaqların həyatına müsbət və ya mənfi təsirini göstərir. İnterfeyslərin uşaqlar üçün müsbət tərəflərini nəzərə alaraq, yarana bilmə ehtimalı olan sağlamlıq, intellektual, sosial, əxlaqi problemlər kimi məsələləri həll etmək üçün müəyyən addımlar atılmalıdır. Uşaqlar üçün yaradılan interaktiv texnologiyalar adətən dizayn qrupları tərəfindən yaradılır. Bu qruplara dizayn və qiymətləndirmə metodlarında təcrübəli insanlar və hədəflənən konkret uşaq populyasiyasının mütəxəssisləri cəlb olunur. Eyni zamanda texnologiyanın toxunduğu mövzular üzrə ekspertlər də mütləq şəkildə qruplarda öz yerini almalıdırlar. Məsələn, rəqəmsal kitabxana tətbiqi yaradılırsa, bir kitabxanaçı qrupa daxil edilməlidir. Bəs texnologiya uşaqlara bacarıqlarını inkişaf etdirmək və məlumat öyrənmək mövzusunda necə kömək edə bilər? İnteraktiv təlim texnologiyaları ənənəvi təhsil sisteminə inteqrasiya edərək uşaqların qabiliyyətlərinin ortaya çıxarılmasında xüsusi rol oynayır. Təlim texnologiyaları hazırlanarkən öyrənən mərkəzli dizayn yanaşmasından istifadə edilməlidir. Bu yanaşmada əsas amillər cəlbedicilik, aydınlıq, yaşa uyğunluq və vizaul effektlər qəbul edilir. Təlim üçün yaradılan oyun tətbiqləri çətin məzmunlu mövzuları uşaqların qavraması üçün daha sadə formada təqdim edir. Marshall (2007) öyrənmə fəaliyyətlərinə yönəlmiş uşaqlar üçün maddi istifadəçi interfeyslərinin tədqiqi və inkişafına rəhbərlik etmək üçün çərçivə işləyib

hazırlamışdır. Altı perspektivdən ibarət olan bu çərçivə öyrənmənin arxasında duran səbəbləri daha yaxşı anlamamız üçün bizə kömək edir. Bura öyrənmə sahələri, öyrənmə fəaliyyəti, təsvirlərin inteqrasiyası, konkretlik və birbaşalıq, fiziki görünüşün təsiri və mümkün öyrənmə faydaları daxildir. Məktəblərə kompüter əsaslı öyrənmə gətirməkdə çətinliklərdən biri kompüterləri təhsil mühitinə ən yaxşı şəkildə necə daxil etməkdir. Məqalədə uşaqlar üçün yaradılan interaktiv texnologiyalar və onların təsiri araşdırılır. sas mövzulara interaktiv elementlər və oyunlaşdırma vasitəsilə təkmil motivasiya, adaptiv texnologiyalar vasitəsilə fərdiləşdirilmiş təlim və tənqidi idrak və rəqəmsal bacarıqların inkişafı daxildir. Məqalə həmçinin təhsil resurslarına bərabər çıxışı müdafiə edərkən ekran vaxtı ilə bağlı narahatlıqlar və rəqəmsal təhlükəsizlik kimi problemlərə də toxunur.

Use of Generative AI-assisted Feedback in Academic Writing Courses

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Key Words: Gen-AI assisted feedback, Chat GPT, academic writing, hybrid education

Feedback is essential for students' learning and development at higher education level. has a very important place (Price, Handley, & Millar, 2011). New to academic writing in the studies of associate, bachelor's, master's and doctoral level students, feedback is the primary academic tool for improving quality and advancing writing skills. development activity. In academic writing, the feedback that the lecturer gives to the student notification is also a pedagogical activity (Li, Hyland, & Hu 2017). However, despite the advantages of giving feedback to academic essays, providing high-quality feedback to students remains a challenge. Factors contributing to this challenge include the lack of understanding of feedback principles, the complexity of evaluating writing assignments in timely manner, and the need for domain-specific expertise (Dai et.al.,2023). With the emergence of AI tools, particularly ChatGPT4-o, which has sparked a global discourse on its potential to significantly impact the current education system. The introduction of ChatGPT has initiated discussions on the considerable ways how AI can support educational endeavors, such as providing AI-generated feedback, enhancing essay writing, and improving feedback sources in higher education settings.

In this study, studies on feedback in university level academic writing to reveal the importance of feedback in the academic writing process is aimed. The research aims to provide a holistic approach to studies on academic writing as well as providing a way of looking at the future studies to be carried out in this field will be a guiding light.The purpose of this study is to examine and describe AI-Generated writing feedback experiences of English instructors in a

private university's English preparatory school in Turkey, Istanbul and their perceptions of AI integration in writing classes as a way of delivering formative feedback regarding the use of hybrid learning environment. More specifically, this study strives to reveal and understand the enablers and barriers of delivering effective feedback in academic writing courses from instructor and students' perspectives and hence identify the important characteristics of giving academic feedback on writing skill.

User-centric experience heuristics approach based on Advanced design patterns for AI application assessment

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Key Words: Usability evaluation, Quantifying method, User-centric AI experience.

Artificial Intelligence (AI) technology has been adopted and employed in most domains to develop applications for providing various automated services. As we step into 2024, the integration of AI into digital products has transitioned from a creativity to a necessity. However, with this transition comes the responsibility of deploying AI technologies that are not only innovative but also deeply aligned with user needs and ethical standards. The effectiveness of these applications depends on their usability, which is a critical factor in their success. Researcher keep focusing on generating a wide range of concepts, by proposing principles to offer a comprehensive framework for navigating these challenges, ensuring that AI serves as a powerful ally in enhancing the

user experience (UX). One approach to evaluating the usability of these applications deals with using a questionnaire. From common design patterns for AI products, we have proposed a set of heuristics. The resulting heuristics serve as a method to evaluate UX in AI applications by establishing a questionnaire list.

Users' Perceptions of Voice Assistants' Effectiveness: The Interplay of Trust, Intelligence, Information Accuracy, and Usefulness

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Key Words: Voice Assistants, User Perceptions, Effectiveness.

Voice Assistants (VAs) are AI-powered programs that use Machine Learning, voice recognition, and natural language processing to answer user questions and perform various tasks. VAs allow users to choose their preferred gendered voice, language, and accent or keep the default setting as is. Despite the abundant studies of VAs), scarce research has examined the factors users employ in evaluating the effectiveness of their VAs. This study examined college students' VAs' usage, perceptions of trust, intelligence, usefulness, and information accuracy, and their challenges in interacting with them. The findings from this study have implications for designing user-centered VAs, improving users' interactions, and empowering users with AI literacy skills. A model representing the interplay between and among the participants' perceived trust, intelligence, usefulness, and information accuracy of their VAs is generated and will be shared in this presentation.

Background Studies revealed that users' perceptions of trust in their VAs were impacted by various factors, including but not limited to failures, lack of feedback, usefulness, content credibility, VAs' expertise, interaction quality, and social interaction and presence. Research that examined users' perceived intelligence of their VAs found that understanding speech input, feedback output, and acceptance of blame when virtual agents committed errors symbolized intelligence. Other studies showed that the VAs' comprehension of voice commands, learning, and human-like ability impacted users' judgment of intelligence. One study found that the VAs' voice accent was a factor

in judging the reliability and accuracy of the information; mainly, users perceived the British accent to provide more accurate information than the American English accent. In summary, the reviewed literature revealed that various factors influence users' perceived effectiveness of their VAs. This study addresses this research question: How do users' perceived trust, information accuracy, usefulness, and intelligence of their VAs influence the effectiveness assessment?

Method This study collected quantitative and qualitative data from 150 college students (final sample with complete responses) aged 18-35 at a US university using an online questionnaire with 52 closed—and open-ended questions about usage and perceptions of VAs. The University's Institutional Review Board approved this study and questionnaire. Students were recruited from two classes requiring research participation for a credit.

Findings The Interplay of Perceived Trust and Information Accuracy Most participants (68%) highly trusted their VAs' information accuracy because they are connected to the internet, retrieve online information, perform simple tasks, and provide accurate responses. The rest had low perceived trust due to failure to comprehend requests and providing incorrect information. The Interplay of Perceived Usefulness and Information Accuracy. Nearly 49% perceived the usefulness of their VAs due to their accuracy in processing requests; 30% were satisfied with their VAs because they provided accurate information; 21% found them useful for performing routine tasks; 36% were not satisfied due to VA failures, such as processing requests inaccurately or misunderstanding requests; and 14.67% had issues with their VAs, such as going off on their own. The Interplay of Intelligence and Trust. We found a significant correlation between users' perceived intelligence of their VAs and trust in providing accurate information.

Conclusion Most participants had misconceptions regarding the accuracy of internet information and the perceived intelligence of their VAs, believing that since their VAs are connected to the internet, they provide accurate information. This calls for intervention by educators and information professionals to offer AI literacy training, including but not limited to how VAs work, how to evaluate responses to queries, and how to phrase questions or requests. The failures participants experienced require system designers' intervention to provide design improvements that support user interactions and cognitive and emotional experiences.

UX Evaluation Methods: Current Use and Method Selection Factors In The Digital Industry

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Key Words: UX Evaluation, Artificial Intelligence, Method selection

Many User Experience (UX) evaluation methods have evolved since early 90's in both UX practice and research. Three main types of these methods are heuristic evaluation, user tests, and questionnaires (Tullis & Albert, 2008). While heuristic evaluation is based on expert review via checking the system against established or predefined UX heuristics (Erdinc, 2016), user tests require collecting real-time observational and measurable data from the users, and analysis of these data serves to spot UX problems and potential improvements. The user test can be further enhanced by using eye-tracking technology, which makes possible analyzing real-time eye movement patterns of the users. UX Questionnaires such as System Usability Scale can reveal subjective user perception toward various UX aspects of a system (Sauro & Lewis, 2024).

In addition to these conventional methods, recent advances in Artificial Intelligence (AI) technologies introduced new tools into UX practices which can be used for many purposes such as analyzing test data or rapid development of alternative designs (Stige et al. 2023). The UX evaluation methods can be selected based on several factors; in industry settings, time pressure and application cost can be leading factors, whereas the analytic capability of a method can have precedence in research studies. This study focuses on the industry side and explores the current use of UX evaluation methods, the comparative importance of the factors that affect method selection, as well as ways and challenges in using AI tools in UX evaluation.

The study is now in the data collection phase, and the full text will include exploratory and statistical data analysis, and discussion part based on these analyses.

The data is collected via a survey among a participant group of Turkish UX professionals including UX designers, UX researchers, product owners, business analysts, and UX/UI designers. The first part of the survey will show participant information and the digital systems they work on such as web-based systems, mobile apps, corporate or financial systems.

The second part of the survey explores the current use of UX evaluation methods and scores the perceived importance of factors that drive the selection of UX evaluation methods. The UX evaluation methods include heuristic evaluation, user tests (i.e., lab, remote, and guerrilla tests), user observations, user interviews, UX questionnaires, eye tracking, and AI tools. The factors explored include cost and difficulty of application, rapid and detailed data collection, having sufficient knowledge about the method in the literature and within the digital industry. The statistical analysis of the mean factor scores will reveal the significant priorities among the professionals toward the selection of UX evaluation methods.

The third part explores the ways of using AI in UX evaluation, such as analysis of user test data, developing test scenarios and improvement suggestions, reporting, and identifying user groups. In addition, challenges in using AI for UX practices were explored by analyzing difficulties such as problems of learning and effectively using AI tools, data security and privacy concerns, as well as the integration of AI with other systems.

The study will provide significant insights into the use of UX evaluation methods and the factors that affect the selection of these factors, which will be helpful for researchers who work to develop new evaluation methods or improve existing ones. The study aims to shed light on the use of AI tools and challenges in using these tools, which can guide users and developers of AI tools in the UX context.

Visual Attention and Code Comprehension: An Eye-Tracking Approach to Understanding Programmer Behavior

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Key Words: eye-tracking technology, programming expertise, cognitive load, visual attention, novice programmers, expert programmers, problem-solving strategies, computer science education, debugging

This study explores the cognitive processes and problem-solving strategies of novice and expert programmers through eye-tracking technology. The objective is to analyze visual attention and cognitive load during coding tasks within the LeetCode environment to understand how programming expertise influences efficiency and methods in code development and debugging. The participants, university students with varying programming experience, were tasked with solving fundamental programming problems and debugging existing code. Real-time eye-tracking data provided insights into their visual and cognitive engagement. Findings indicate that expert programmers exhibit more efficient visual patterns and problem-solving strategies, while novices display higher cognitive load and scattered visual attention. These results have important implications for educational strategies, which suggest that personalized approaches based on cognitive behaviors can enhance computer science education by bridging the gap between novice and expert programmers.

Yabancı Dil Eğitimde Yapay Zekâ Videolarının Kullanımına Yönelik Sistematik Literatür İncelemesi

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Key Words: Yapay zeka, yabancı dil edinimi, video

Dijital çağda yapay zeka ve uygulamaları; bilgisayar, sanal asistan, navigasyon, güvenlik sistemleri, ticaret, dil çevirileri, gazetecilik alanlarında olduğu gibi eğitim alanında da çokça kullanılmaktadır. Yapay zekânın içine bilgisayar mühendisliği, nöroloji, felsefe, psikoloji, robot bilimi ve linguistik gibi birçok alan girmektedir. Yapay zeka; algı, akıl yürütme, düşünme, öğrenme, kavrama, sezgi ve tasarlama gibi insan zekasına özgü davranışlar sergileyen bilgisayar yazılımı, robot tasarımı, vb. konularını da incelemektedir (Budak, 2017).

Bu sistematik derlemenin amacı yabancı dil eğitiminde öğrenenlere sunulan videolarda yapay zekanın rolünü incelemektir. Sistematik derleme, bir literatür taraması olarak tekrarlanan arama stratejilerinin uygulaması olarak belirli soruları yanıtlayan ve açık kriterlere göre dahil edilen ya da hariç tutulan çalışmaların incelenmesidir (Gough, Oliver ve Thomas, 2017). Potansiyel çalışmaların belirlenmesinin ardından, tutarlı ve şeffaf bir inceleme süreci sağlamak için PRISMA kılavuzları (Moher vd., 2015) uygulanmıştır. Bu sistematik derleme, yabancı dil ediniminde kullanılan videoların yapay zeka ile ilişkilendirilmesi amacına yönelik olarak altı uluslararası veritabanında indekslenen İngilizce hakemli makaleleri hedeflemiştir. Bunlar Web of Science,

Scopus, ERIC, EBSCO, ScienceDirect ve WOS'tur. Aramalar herhangi bir zaman sınırlaması olmaksızın Mayıs 2024'te gerçekleştirilmiştir. Arama dizinleri; "AI, artificial intelligence, video, language education, language teaching, language learner" dur. İlk aramada 804 makale kaydı tespit edilmiştir. Sonrasında yapılan taramalarla makale sayısı düşmüştür. Kitap, kitap bölümü, konferans, sempozyum, rapor, ders notu gibi çalışmanın amacı dışında kalan metinler elenmiş ve en son arama terimlerine ve çalışmanın amacına uygun olan 28 makale tespit edilmiştir. Veri çıkarımı ve analizi Arpacık (2024) tarafından geliştirilen inceleme yazılımı ile kolaylaştırılmıştır.

Her bir çalışmayı sistematik olarak analiz etmek için, inceleme sistemimiz içinde ayrıntılı bir form oluşturulmuştur. Bu form, araştırma sorularımıza dayalı olarak çalışmaların çeşitli yönlerini yakalamak için tasarlanmıştır. Yöntem bölümü analizi için Küçük ve diğerleri (2013) tarafından geliştirilen Eğitim Teknolojisi Makale Sınıflandırma Formunu kullanılmıştır. Bu sınıflandırma, çalışmaların metodolojik yaklaşımlarına göre kategorize edilmesine yardımcı olarak daha yapılandırılmış ve sistematik bir analiz yapılmasını sağlamıştır. Bu parametreler ülke, yöntem, nicel desenler, nitel desenler, karma desenler, tarama desenleri, veri toplama araçları, örneklem sayısı, değişkenler, yapay zeka araçları, dil kullanım alanları, eğitim süresi, eğitim seviyesi, kullanılan platformlar, teorik çerçeve, yapay zeka araçlarının kullanımı, güçlü sonuçlar, zayıf göstergeler ve öneriler şeklindedir.

İncelemeler sonucu çıkan sonuçlarda makalelerin en çok yapıldığı ülkelerin Çin ve Amerika Birleşik Devletleri'nin olduğu, az da olsa Hindistan ve Suudi Arabistan'da da yapılan çalışmalara rastlandığı tespit edilmiştir. Makale yayın yılı olarak tüm makalelerin 2000 yılı sonrası ve özellikle de yapay zekanın trend olduğu 2020 yılından sonra gerçekleştiği görülmektedir. Yöntem olarak en çok nitel, nicel ve karma desenlerin kullanıldığı görülmektedir. Nicel desenler olarak en çok tam deneysel çalışmaların yapıldığı, nitel olarak ise içerik analizi ve durum çalışmasının yapıldığı tespit edilmiştir. Karma desen olarak ise en çok tasarım tabanlı çalışmaların yapıldığı görülmektedir. Veri toplama aracı olarak en çok anket, görüşme ve doküman incelemesi yapılmış, örneklem sayılarının ise genel olarak farklı sayılarda kullanıldığı tespit edilmiştir. Değişkenlerin en fazla davranış ve memnuniyet üzere olduğu ve yapay zeka araçlarının ise sistem tasarımı, ChatGPT, video chatbot şeklinde olduğu görülmektedir. Dil kullanım alanı olarak en çok speaking kullanılmış ve eğitim seviyesinin de ilköğretimden lisansüstüne doğru çeşitlilik gösterdiği tespit edilmiştir. Eğitim süresinin 2 haftadan 16 haftaya kadar çıktığı görülmüş, kullanılan

platformların genel olarak tasarlanan yapay zeka platformlarından oluştuğu ve ayrıca YouTube video paylaşım sitesindeki videoların da kullanıldığı tespit edilmiştir. Teorik çerçevelerin en çok dil modelleri, yapay zeka, multimedya, ters-yüz sınıflar ve öz düzenleme gibi dil, eğitim ve iletişim alanlarına yönelik olduğu görülmüştür. Sonuç olarak ise genel olarak yapay zeka destekli dil eğitiminde video materyalinin performansı artırdığı, öğrenme ilgisini uyandırarak öz düzenlemede yardımcı olduğu, yabancı dil öğrenenlerdeki kaygı durumunu azalttığı, YouTube tabanlı dil eğitiminde dil eğitimcileri için kullanılabilirlik ve çok yönlülük gibi avantajlar sunduğu söylenebilir. Çalışmalardan çıkan öneriler olarak sadece İngilizce değil kültürel çeşitliliği artırmak için Fransızca, Arapça gibi dillerde de bu çalışmaların yapılabileceği, önerilen yapay zeka sistemlerinin gerçek zamanlı olarak kullanılabileceği ve eğitimcilerin yanında eğitim sektöründe çalışanların da bu uygulamaları kullanabileceği önerilmektedir.

Yapay Zeka Araçlarıyla Zenginleştirilmiş Öğretim Teknolojileri Dersinin Öğretmen Adaylarının Yapay Zekâ Okuryazarlıklarına ve Dijital Materyal Tasarım Yeterliklerine Etkisi

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Key Words: Yapay zeka, dijital yeterlilik, dijital materyal tasarımı, öğretmen adayları, öğretmen eğitimi

Eğitimde teknolojinin artan kullanımı, öğrenme ortamlarını, materyallerini ve öğretici kaynakları köklü bir şekilde değiştirmekte ve geliştirmektedir. Bu süreçte en hızlı gelişim gösteren teknolojilerden biri olan yapay zeka (YZ), eğitim alanında da önemli bir etkiye sahiptir. YZ teknolojilerinin eğitime entegrasyonu, özellikle gelişmiş bilişsel görevlerin hızla yerine getirilmesini sağlamakta, böylece bilgi yönetimi, sunumu ve öğretim süreçlerine katkı sağlamaktadır (İpek vd., 2023). Eğitimde YZ uygulamaları, öğrencilere ve eğiticilere bilginin yönetimi ve sunumunda yardımcı olmanın yanı sıra, öğretici rolü üstlenme, öğretim materyalleri sağlama, somutlaştırma ve özetleme gibi işlevleri de yerine getirmektedir (Arslan, 2020; Dembere vd., 2023; Taşçı ve Çelebi, 2020). Bu bağlamda, eğitimcilerin YZ okuryazarlığına sahip olmaları, YZ teknolojilerini anlamlı ve etkin bir şekilde kullanabilmeleri açısından büyük önem taşımaktadır. Özellikle üretici YZ teknolojileri, eğitimde materyal geliştirmeyi oldukça kolaylaştırmaktadır. Öğretmenlerin

ve geleceğin öğretmenleri olacak öğretmen adaylarının çağın getirdiği teknolojik destekle dijital materyal tasarımı konusunda yeterlilik kazanmaları önemli bir husustur. Bu çalışmanın amacı, YZ araçlarıyla zenginleştirilmiş öğretim teknolojileri dersinin öğretmen adaylarının YZ okuryazarlıkları ve dijital materyal tasarım becerileri üzerindeki etkisini incelemektir.

Araştırmada tek grup ön test-son test zayıf deneysel yöntemi kullanılmıştır. Çalışmanın örneklemi Eğitim Fakültesi Sosyal Bilgiler Öğretmenliği bölümünde öğrenim gören 50 (41 kadın; 9 erkek) öğretmen adayından oluşmaktadır. Veri toplama araçları olarak Çelebi vd. (2023) tarafından geliştirilen Yapay Zekâ Okuryazarlık Ölçeği (YZOYÖ) ve Kabaran ve Uşun (2021) tarafından geliştirilen Dijital Materyal Tasarımı Yeterlilikleri Ölçeği (DMTYÖ) kullanılmıştır. Bu ölçekler, dönem başında ön test ve dönem sonunda son test olarak uygulanmıştır. Araştırma kapsamında, öğretim teknolojileri dersi YZ teknolojileriyle zenginleştirilmiş ve öğretmen adayları ders sürecinde ChatGPT ve Gemini gibi YZ destekli sohbet robotlarını çeşitli amaçlarla kullanmıştır. Ayrıca, görsel oluşturma ve düzenleme, sunu hazırlama, video üretimi ve düzenleme, oyun tasarımı ve animasyon oluşturma gibi konularda farklı YZ araçlarının kullanımı üzerine uygulamalı eğitimler verilmiştir. Öğretmen adayları, bu teknolojileri Sosyal Bilgiler müfredatına entegre ederek ders planları ve dijital materyaller geliştirmiştir.

Verilerin analizinde bağımlı gruplar t-testi kullanılmıştır. Sonuçlar, öğretmen adaylarının YZ okuryazarlık düzeylerinin başlangıçta düşük iken, dönem sonunda önemli ölçüde arttığını göstermiştir. Benzer şekilde, dijital materyal tasarım yeterlilikleri başlangıçta orta düzeyde iken, ders sonunda yüksek düzeye ulaşmıştır. Bağımlı gruplar t-testi sonuçlarına göre, öğretmen adaylarının YZ okuryazarlıklarında ve dijital materyal tasarım yeterliliklerinde ön test-son test arasında yüksek etki büyüklüğünde anlamlı farklılıklar ortaya çıkmıştır (YZÖYÖ için $t(49) = -8.529$, $p < .001$, $d = 1.68$; DMTYÖ için $t(49) = -8.075$, $p < .001$, $d = 1.57$).

Sonuç olarak, YZ araçlarıyla zenginleştirilmiş öğretim teknolojileri dersinin, öğretmen adaylarının YZ okuryazarlıkları ve dijital materyal tasarım yeterliliklerinde anlamlı iyileşmelere yol açtığı açıkça görülmüştür. Bu çalışma, YZ entegrasyonunun sadece öğretim süreçlerini desteklemekle kalmayıp, aynı zamanda öğretmen adaylarının dijital materyal tasarım becerilerini de önemli ölçüde geliştirebileceğini göstermektedir. Ayrıca, elde edilen bulgular, eğitim fakültelerindeki ders müfredatlarının YZ teknolojileriyle zenginleştirilmesinin, gelecekteki eğitimcilerin modern

eğitim araçlarını etkin bir şekilde kullanma kapasitesini artırabileceğini göstermektedir. Bu tür programların, öğretmen adaylarının mesleki yeterliliklerini güçlendirme potansiyeli göz önünde bulundurulduğunda, eğitim politikalarında ve programlarında YZ teknolojilerinin daha fazla yer bulması gerekliliği ortaya çıkmaktadır. Eğitim fakültelerinde bu tür yenilikçi yaklaşımların yaygınlaştırılması, öğretmen adaylarının 21. yüzyıl becerileriyle donatılmasını destekleyecek ve gelecekteki eğitim kalitesini olumlu yönde etkileyecektir.

From Figurative to Abstract: A GAN Tool for Art and Design Education

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Key Words: Generative Artificial Intelligence, Deep Learning, Art and Design Education, Visual Abstraction

The study explores the integration of artificial intelligence (AI) tools into art and design education, focusing on the teaching and learning process of visual abstraction. Abstraction, a foundational concept in aesthetic education, underpins students' ability to analyze and reinterpret visual elements beyond their representational and figurative qualities. The research introduces a generative AI tool specifically designed to support educators in guiding students through the analytical phases of abstraction, facilitating a structured and accessible educational process. By addressing a critical gap in art and design pedagogy, the study highlights how such tools can enhance teaching efficiency and educational outcomes.

Visual abstraction is integral to basic design education, where students are trained to recognize shapes, spatial relationships, and compositional elements without relying on narrative content. Traditionally, this process requires extensive guidance from educators and iterative feedback, which can be challenging to standardize across diverse educational contexts. The proposed generative tool addresses these challenges by providing interpretable visual outputs that reflect abstracted elements, enabling educators to present these intermediate stages more effectively.

The findings are based on expert evaluations conducted with art and design educators, who assessed the tool's outputs and its potential role in the classroom. Experts highlighted the tool's capacity to produce abstracted images that align with the pedagogical objectives of basic design courses. These outputs were deemed effective in representing the analytical phases of

abstraction, offering educators a valuable resource for fostering critical thinking and compositional understanding among students. The experts noted that the generative tool enables educators to present multiple pathways of abstraction, facilitating a nuanced exploration of abstract forms and enhancing the interpretive process in the classroom.

The expert evaluations also emphasized the adaptability of the tool to various teaching styles and its potential to address different educational goals. The generative outputs were commended for their clarity and alignment with foundational design principles, making them particularly useful for teaching abstraction as a process. Furthermore, the tool was recognized for its role in supporting educators by providing diverse visual interpretations of abstraction, thereby enriching the teaching experience and improving the overall quality of instruction.

In conclusion, this study contributes to art and design education by presenting an AI-assisted framework that bridges the gap between observation and analysis in the teaching of abstraction. By focusing on the analytical phases, the generative tool provides educators with a scalable and effective solution to enhance abstraction training in basic design courses. The integration of such tools into art and design education has the potential to transform traditional pedagogical methods, making them more interactive, flexible, and aligned with contemporary technological advancements. This research underscores the importance of supporting educators with innovative tools to facilitate a deeper understanding of abstraction and its application in art and design practice.