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문화콘텐츠 영역에서 학습공간 메타버스 플랫폼의 교육산업적 활용

이혜경
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Educational Industry Use of Metaverse Platform as a Learning Space in the Cultural Content Area

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요 약 이 연구는 사회적 환경의 변화에 따른 메타버스 플랫폼의 교육적 활용을 다룬다. 또한, 학습자의 수요와 교육산업의 현실이 맞물리면서 인공지능을 매개로 시현될 그러한 학습의 장(場)이 무엇으로 어떻게 채워져야 하는지도 살피려 한다-흥미롭게도 가상세계 안에서는 다양한 콘텐츠를 활용해 자신의 캐릭터를 만들어 교육 활동에 참여할 수도 있다.-. 이를 위해서 다양한 형태로 표현된 자료를 탐색하면서 교육적 해석을 가미하고자 한다. 특히 메타버스 플랫폼과 관련된 문헌과 실례를 톺아봄으로써 그 기능 방식을 이해하고 설명하는 전거로 삼고자 한다. 주지하다시피 제4차 산업혁명과 코로나19 팬데믹은 전개 과정의 예측 가능성을 뛰어넘었음에도 인공지능이 쓰인 첨단기술을 교육 분야에 적용하기 위한 사회적 환경을 제시해 주었다. 이와 함께 에듀테크(edu-tech)라는 개념의 등장이 시사하듯 교육산업의 발전은 물론 과학기술로 구현된 온라인 공간을 실제 교육의 장으로 탈바꿈시켰다. 이 연구에서는 이 같은 현실 속에서 교육 플랫폼으로서 메타버스가 다양한 기술의 복합적 적용으로 개발된 문화적 콘텐츠를 활용해 차별화된 경험과 가치를 제공하는 모습을 보여줌으로써 교육산업의 현장을 새롭게 형성할 수 있는 가능성을 확인하였다. 그리고 이는 기존 교육방식의 한계를 극복할 수 있는 하나의 대안이 될 수 있으리라 본다.

주제어 : 메타버스, 인공지능, 교육 플랫폼, 가상 공간, 코로나 19, 4차 산업혁명

Abstract This study aims to examine the educational use of the metaverse platform according to changes in the social environment. In addition, it will examine how and with what the learning space to be realized through artificial intelligence should be filled as the learner's demand and the reality of the education industry are intertwined.(Interestingly, in the virtual world, each person can create their own character and participate in educational activities by utilizing various contents.) To this end, it will explore materials expressed in various forms and add educational interpretation. In particular, it will examine literature and examples related to the metaverse platform to understand and explain its functioning method. As is well known, the 4th industrial revolution and the COVID-19 pandemic have presented a social environment for applying cutting-edge technologies using artificial intelligence to the field of education, even though they have surpassed the predictability of the development process. Edu-tech, which emerged in this situation, has not only developed the education industry but also transformed online spaces into actual educational spaces. In this reality, this study confirmed the possibility that the metaverse as an educational platform can reshape the field of the education industry by showing how it can provide differentiated experiences and values by utilizing cultural content developed through the complex application of various technologies. And this could be an alternative that can overcome the limitations of existing educational methods.

Key Words : Metaverse, Artificial intelligence(AI), Educational platform, Virtual Worlds, ,COVID-19 pandemic, The Fourth Industrial Revolution

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1. Introduction

“Will the development of science and technology become a means to enrich human life?” Or, is the development of science and technology the purpose of human existence? It is certainly true that the invention of numerous technologies has further developed human life

Nevertheless, many people feel insecure and alienated as science and technology develop. It may just be vague anxiety, but sometimes it appears as a specific phenomenon. And material civilization also leads to the phenomenon of alienation shown by the results.

In addition to this, incidents that provide new interpretations to these phenomena are appearing one after another. One of the representative examples is the 4th industrial revolution, and another is the COVID-19 pandemic. The Fourth Industrial Revolution caused fundamental changes in all areas of society, including economy, society, culture, and education, and the COVID-19 pandemic rapidly led to changes in the social environment.

The impact was particularly great in the field of education. As the so-called untact education continues, new problems are being revealed. But what's interesting is the consensus of experts who say that things that will happen someday only appear a little sooner.

There is a transition from simple curriculum-based learning to project-based learning, from one-way knowledge transfer education to mutual learning through sharing and cooperation, from short-term education to lifelong education, and from unified classroom education to three-dimensional education. Changes in the education sector are being realized through numerous technologies developed based on artificial intelligence, including the metaverse. This study is starting from this reality.

2. Presentation of an educational platform as a research method and technological changes in the social environment

2.1 Realistic Response and the Social Perception of Technology

First of all, assuming the metaverse as an educational platform, which is the task of this study, two contents discussed as a research method are as follows.

First, should the AI technology and the level of completion of the metaverse be much higher than now? It is about. The second is to examine the metaverse based on the AI technology developed so far with various criteria presented so far.

Of course, both of these issues presuppose the educational possibility of the metaverse. Metaverse and AI have become state-of-the-art technologies that cannot leave us anyway. Therefore, if metaverse exists for humans, it is to explore the importance of education in the field of education, such as technology and human conditions and directions.

The existence of metaverse is generally combined with several new technologies. However, it is rare to discuss metaverse from an educational point of view, and it focuses on metaverse-related technologies in education.

What is clear is that COVID-19, which is trending around the world, is fundamentally changing our daily lives in line with the 4th industrial revolution, and accelerating digital transformation based on information technology (IT) such as artificial intelligence, data, and cloud. to be. In particular, the spread of non-face-to-face contact culture, which is being implemented to prevent the spread of infection, is bringing about many changes in the field of education. Online classes and blended learning that can be conducted in a non-face-to-face situation between instructors and learners or between learners through the

experience of responding to COVID-19 through digital technology are being attempted in various forms.

Metaverse is becoming a new educational platform based on the interaction between the virtual world and the real world.

2.2 Learning and Remodeling with AI

Artificial intelligence is a field of computer science that focuses mainly on solving cognitive problems linked to human intelligence, such as learning, problem solving, and pattern recognition. AI may always be expressing the future based on the present, but it is now becoming a reality of advanced computer engineering. And both machine learning and deep learning can be said to be computer science derived from the field of AI.

As one example, machine learning, a major concept in AI associated with education, learns from recorded data that mainly applies to pattern recognition and learning, predicts it based on it, and optimizes basic utility functions under uncertainty. It is also a collection of algorithms that can extract hidden structures from the data and classify the data into concise descriptions.

In some ways, the basis for constituting the diversity of learning techniques is the use of educational data. AI is learning faster and smarter with more data. Companies like Google and Amazon are generating the formulas needed to run machine learning and deep learning solutions while collecting huge amounts of information and learning materials through data warehouses and ground-truth statistics.

Interestingly, apart from this technical background, the AI discourse shown by members of society appears in a more specific way. In particular, the social appearance of AI spread praise and fear to society at the same time. For example, people were enthusiastic and surprised at the progress of technology, which had become a reality, as they saw AI conquering Go following a chess match between the world chess champion and IBM's chess AI computer "Deep Blue." In addition, Google's self-driving car accident is noteworthy. The question of who will be held responsible for the accident in which the computer program of the autonomous driving system could not respond has been debated. Numerous discourses about AI accurately illustrate this consciousness.

There must be some implications of this situation and phenomenon. Therefore, even if research on artificial intelligence is conducted mainly in the field related to the industrial field, philosophical, sociological, and educational research on it should not be left out.

This is even more true in the case of a metaverse based on artificial intelligence. The meaning of artificial intelligence is slightly different in the field of education where various academic fields are involved. The educational use of the metaverse platform can be more effective when artificial intelligence is added. For example, recent generative artificial intelligence is proving the utility of such a platform. That is the social development of artificial intelligence, and the reason why discussions on the metaverse should become more active.

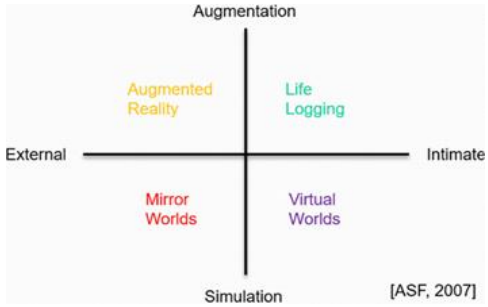
2.3 The emergence of the metaverse

Drawing A distinct concept for the metaverse has

not been clearly established. Since the term was first used in Neal Stephenson's novel "Snow Crash (1992)", the Acceleration Studies Foundation(ASF) in the US first summarized the metaverse concept in 2007. The IEEE defines the metaverse as an advanced Internet consisting of permanent three-dimensional virtual spaces linked to a perceived virtual world. Practically, in 2020, NVIDIA introduces the real-time 3D visualization collaboration platform 'Omniverse' and explains the metaverse as the second Internet, and Roblox makes an IPO, By explaining the service of 'Metaverse', the metaverse came to be recognized as a new world that crosses the boundary between reality and virtuality.

In general, metaverse is a combination of "meta", which means virtual and transcendent, and "universe," which means the world and the universe, and refers to an online space where human social and economic activities take place one step further than virtual reality. It is used in the sense of "virtual world where everyone uses avatars to engage in social, economic, and cultural activities" or "three-dimensional virtual space where social and economic activities such as the real world are common." Recently, it has been actively expanding its scope by adding 'reality' to the existing concept of a three-dimensional virtual space, calling it a "fusion of virtually expanded physical reality and physically permanent virtual space."

ASF is presenting two key axes to materialize the concept of the metaverse and explain its manifestation. The metaverse was classified into four categories based on one axis that oscillates between 'augmentation technology and simulation' and two axes that oscillate between 'intrinsic and extrinsic factors'. It is classified into Augmented Reality, Lifelogging, Mirror Worlds, and Virtual Worlds. In summary, the types of metabus can be classified into a total of 4 types with 2 axes.



[Fig. 1] Metaverse Roadmap Overview

Augmented Reality refers to a technology that superimposes virtual objects or computer interfaces on a physical environment basis. An example of this is the non-existent dotted line in TV sports broadcasts. Lifelogging is the art of capturing, storing, and describing everyday experiences and information about objects and people. Social media services, including Facebook, fall into this category. Mirror Worlds are worlds that mirror and expand the physical real world. The mirror world refers to a virtual world that reflects the real world as realistically and as it is, but is "informatively expanded". A typical example is Google Earth. Virtual Worlds are digital data that build alternative worlds that are similar to or completely different from reality. In the virtual world, users are characterized by performing activities similar to economic and social activities in the real world through avatars. The virtual world is the most familiar type of metaverse to us.. Among the types of metaverse, the most

diverse and actively used technology for education is the virtual world (VR). In particular, in the recent non-face-to-face, on-tact era of education, the utilization of virtual worlds that can be accessed anywhere regardless of distance or space is very high.

3. Utilization of Metaverse as an educational platform

3.1 The meaning and reality of the educational platform

To AI is transforming educational services and strategies. Predicting the behavior of education consumers using AI-based big data and machine learning also promotes such changes. That is why it is important to understand the educational environment through chatbots, personalized content, marketing automation tools, and real-time data analysis. In the future, as the application of artificial intelligence technology to all areas of education expands, the competitiveness of the educational platform will be evaluated based on algorithms and smart technologies.

Metaverse is an educational platform. There are already attempts to solve the difficulties of existing education by introducing the metaverse experimentally. For example, GATHER enables large-scale seminars with educational value as well as team projects and one-on-one classes with the goal of fully realizing various forms of communication that exist in reality within the virtual world. Gathertown promotes the immersion of learners as it can build a teaching and learning environment with the same structure as a real classroom or school.

[Fig. 2] What are you looking to do on Gather?

In addition, “ifland” is a platform where you can freely communicate by sharing videos or documents with more people at conferences or performances. The platform also has a feature that allows voice commentary based on shared files. Like the ZOOM platform we are familiar with, the host can set up microphone control, manipulate presentation materials, and even have conversations. Various map settings such as conference halls, cafes, classrooms, and playgrounds are possible.

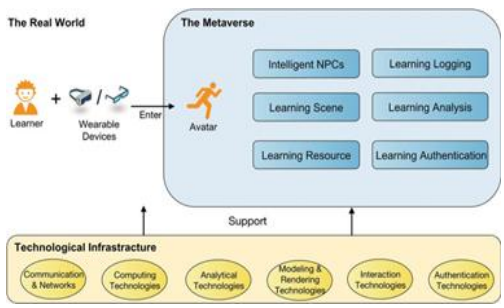
Therefore, metaverse as an educational platform presupposes active interaction within the virtual world, not simply education using virtual reality (VR) and augmented reality (AR). Many research cases confirm the educational effectiveness of metaverse and virtual reality, but that does not solve the essential problems that education aims for.

The metaverse is a space where avatars work, but the starting point is real people, so privacy, data protection, data transparency and ethical use are very important issues. In the midst of these problems, the distance caused by the COVID-19 pandemic has

promoted non-face-to-face daily life throughout our society, and the metaverse has emerged as an alternative to maintaining human social activities. In particular, as non-face-to-face classes have been prolonged, classes using the metaverse have emerged as a trend, but it seems urgent to build an educational environment and develop rich content because the value of its use has not been sufficiently studied in advance.

3.2 Practical use of education platform using metaverse

The metaverse types of augmented reality, lifelogging, mirror world, and virtual world will cross boundaries and interact with each other, developing into a new type of educational service. The metaverse made social connection possible despite the restrictions in reality caused by COVID-19. The new space provided by the metabus platform has been changed to a structure that enables experiences and simulations that enable empathy and communication. Metaverse enables users to directly participate in the virtual world and create educational values and exchanges in the real world. In the field of education, it is possible to design learning activities that can infinitely expand students' freedom and experience by actively utilizing the characteristics of the metaverse.



[Fig. 3] The Framework of the metaverse in education

As shown in the figure above, the realization of the metaverse in education is highly dependent on the latest technology. Therefore, various technologies can become the infrastructure of the metaverse in education, responsible for massive support of components in both the real world and the metaverse world. For example, high-speed networks provide learners with a good opportunity to remotely and seamlessly transition from the physical world to the metaverse education environment, and edge computing, cloud computing, and distributed computing technologies enable learners to access learning data accurately, efficiently, and store , use and share.

Educational activities in the virtual world beyond the limits of time and space will be more active in order to respond to situations such as the pandemic era as science and technology develop. Moreover, since they participate in activities while adjusting their avatars as if they were playing games, they can engage in educational activities with an active attitude.

The expansion of the area of education related to the metaverse is happening rapidly. Due to the complex use of various technologies, Metaverse can provide differentiated experience values from the existing Internet era, and as a result, it is possible to design new experiences that transcend time and space. Metaverse-based education has the advantage of being able to use infinite space and materials, and enabling interaction at the level of face-to-face education. Beyond the limitations of time and space, you can experience a realistic experience by connecting the past and future

worlds. With immersive technologies such as augmented reality and virtual reality, it is possible to increase the interest and immersion of Z generation students who value experience, and to maximize learning effects.

Therefore, researchers and teachers who want to utilize the metaverse for education should properly understand the technical characteristics of each type of metaverse and have an eye for selecting applications and platforms appropriate for the specificity of the subject. They should always think of the educational purpose of expanding and passing on knowledge, not by applying technology, but by enhancing students' imagination and creativity and stimulating their curiosity about the new world.

3.3 Education case using metaverse – case of foreign language education

At least in the field of education, the metaverse is an upgraded concept from virtual reality (VR). Users can perform social and cultural activities that occur in real life by using avatars operated by themselves. Therefore, the metabus presents a new paradigm for language education. One such example is the application of face recognition algorithms for the participation of Metaverse users, and the development of experiential learning contents suitable for each stage of learning to complete language education services ranging from beginner to intermediate to advanced. In other words, it aims to improve the completeness of education through a metaverse-based platform that includes content management.

In particular, using the metaverse for foreign language education is an educational method that has recently emerged after COVID-19. When VR/AR technology is applied to classes, students can solve problems on their own and participate in field simulations through realistic experiences for active learning. In the metaverse class, both teachers and learners present through avatars, so even students who cannot speak a specific foreign language have the effect of participating in class much more actively in a situation where anonymity is guaranteed.

On the other hand, in the education using "ifland" mentioned above, task performance and practical interaction were made possible through interactive communication through various avatars, virtual theme space, image formation, and video.

In addition, the education industry that applies AI to the metaverse is also increasing domestically and internationally. Industrial application cases in language education can be found mainly in IT companies. The 'KidsTopia' service, a metaverse platform launched by LG U+ in May 2023, has surpassed 500,000 cumulative subscribers in Korea and abroad. This is in 1 year and 4 months. KidsTopia is a compound word of 'Kids' meaning children and 'Utopia' meaning utopia, and is a platform where children can learn foreign languages, animals, dinosaurs, space, etc. with AI characters in a 3D virtual experience space. It is particularly popular in Southeast Asian countries. As of the end of August 2024, out of the total 500,000 subscribers, the Philippines accounted for about 32% (about 160,000 people) and Malaysia accounted for about 22% (about 110,000 people). KidsTopia provides services in a total of 8 countries, including South Korea, the Philippines, Malaysia, the United States, Japan, Thailand, Singapore, and Brunei. AI inserted into this metaverse platform for language education of children. Another interesting case is that the character is gaining popularity as a Korean language

learning platform in Southeast Asia. The background for the cumulative subscriber growth is generative AI. LG U+ applied conversational AI to the Kidztopia character, allowing users to have natural conversations with the character, thereby improving the user experience and increasing service immersion. Naver is operating an item creation tool using generative AI on its metaverse platform Zepeto, and SK Telecom has also decided to introduce AI to its metaverse platform 'i-Friend' within this year.

Through this metaverse-based language learning program, learners will be able to experience various forms of digital cultural arts and realistic content, and furthermore, expand their convergence cultural thinking and participate in future-oriented classes.

Educational contents that add variety to the advantages of remote classes in a virtual space will arouse students' interest and further enhance the educational effect. Experiential language activity classes are also available, where students can meet teachers and friends in a virtual space like real life, see, hear, and feel as if they were offline.

4. Conclusion

Metaverse, which develops with AI, will provide an educational environment that is different from before. In the realm of education, today's metaverse combines various technologies such as AR/VR and IoT based on artificial intelligence to design new experiences that transcend time and space. And it will ultimately show the advanced form of industrial technology.

In the field of education, these metaverse characteristics can be actively utilized to design learning activities for students. In a space called the metaverse, students will be able to explore their own questions based on autonomy and carry out their own original learning by referring to the ideas of numerous people transcending time and space. Another aspect of education is realized.

Now, the metaverse is reaching a stage where it can improve its performance on its own without human intervention with cutting-edge technologies, including AI. However, Lifelogging, which appears when explaining the metaverse, can be useful and helpful in terms of storing and managing all behaviors of an individual's daily life as data, but these may be used for purposes other than intended and invasion of individual privacy. Therefore, it can be seen that the system needs to be supplemented.

As an educational platform in the post-human era with the development of artificial intelligence, Metaverse has changed the way knowledge is produced and distributed. The establishment of an 'educational platform' that promotes the renaissance of humanities by using 'AI and Metaverse,' which is emerging as the core of the digital transformation era, as educational content, is now becoming an essential reality. This reality will further promote the development of the education industry. Once again, this study suggests the need to create a realistic classroom environment to design learning methods through metaverse-based education.

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