

Metaverse Education's Challenge to the Copyright Fair Use System: An Empirical Analysis

Zihang Lan^{1#}, Yanru Yan^{1#}, Xiao Wang^{1&}, Rui Fan^{1&}, Yichen Luo^{2*}

*Corresponding author: 1032026396@qq.com
Zihang Lan: 2220007773@student.must.edu.mo
Yanru Yan: thearronshiwo823@outlook.com
Xiao Wang: shawwang1999@163.com
Rui Fan: 115813093@qq.com

¹Faculty of law, Macau University of Science and Technology, Avenida Wai Long, Taipa, Macau SAR, China 999078;

²Faculty of law, Nanjing University of Information Science and Technology, Ningliu Road, Pukou District, Nanjing City, Jiangsu Province, China 210044;

[#]Co-first authors: These authors contributed equally to this work,

[&]Co-second authors: These authors contributed equally to this work

Abstract. As an emerging form of education using VR, AR, AI and other technology, metaverse education poses significant challenges to the "classroom rules" of copyright law due to its online expanded scope of dissemination, incorporation of VR technological subjects, strong commercial nature, and modifications in Metaverse heterogeneous algorithm copying. Through empirical analysis, this paper concludes that, as general rational respondents, 80.17% of respondents believe that metaverse education will commercialize classrooms and that 63.96% of respondents believe that metaverse will make classroom teaching materials more commercialized. The expanded scope of dissemination suggests that the use of other people's teaching materials in metaverse education using information technology will likely violate the copyright owners' rights excessively. Copyright law must respond urgently to the question of whether metaverse classrooms fall outside the scope of the current fair use system, which is essential for the sustainable development of metaverse education.

Keywords: Metaverse Education, Fair Use, Copyright law, Instructional Materials

1 Introduction

With the rapid development of digital technology, new forms of copyright infringement in digital education, stemming from new technologies applications such as AI early education robots [1] and online classroom instruction, have continued to proliferate at an alarming rate. According to *White Paper on the Trial of Digital Education Copyright Cases* published by Beijing Internet Court and Figure 1, the number of cases of digital education copyright disputes has been increasing at a rapid rate over the past four years, and it is anticipated that the volume of such disputes will continue to rise in the future, while a series of disputes arising from Metaverse education may become the mainstay of copyright infringement cases in the near future.

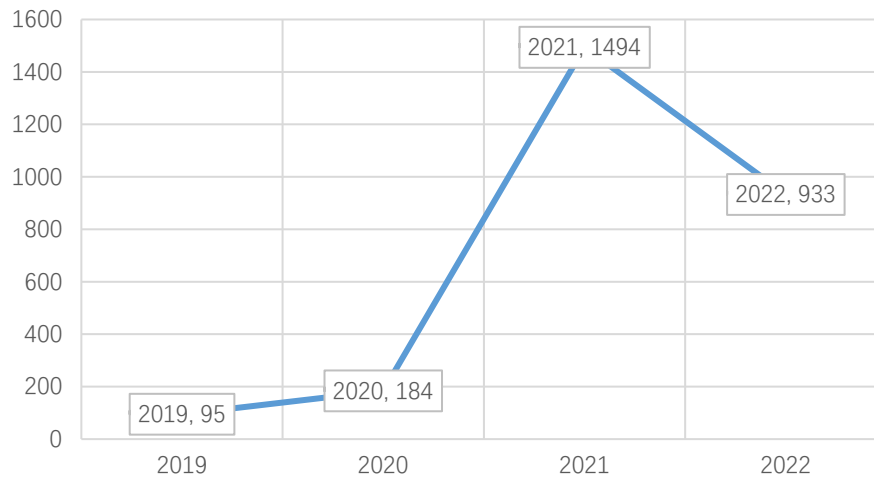


Figure 1 Number Trends of digital education copyright dispute cases accepted by Beijing Internet Court

Metaverse education is a new form of education that primarily employs AR, VR, MR, and AI to create immersive, situational and experiential learning scenarios for students. Distance education has transformed education from offline to online, whereas metaverse education has transformed it from two-dimensional to three-dimensional. In contrast to conventional face-to-face teaching in the same physical place, creating instructional materials in the metaverse classroom necessitates the employment of digital heterogeneous reproductions that transform flat works into stereoscopic works. In addition, as a highly technically demanding form of education, metaverse education necessitates significant capital investment and technical expertise to construct the metaverse, and is therefore frequently criticised for being excessively commercial in comparison to traditional schooling for the public interest. In the above-described metaverse education circumstance, the fair use system of copyright has been significantly challenged. This paper will therefore endeavour to provide a comprehensive analysis of copyright risks in Metaverse education through both case and empirical jurisprudential analysis.

This study dispatched questionnaires to instructors, students, computer professionals, and law practitioners. There are a total of 4 questions on the questionnaire, and 1054 valid responses were received. The analysis of pertinent results can be found in the following chapters.

2 Expansion of dissemination

Metaverse education can overcome limitations of space and time, solving the problem of not being able to conduct real-world experiments with a large number of students and dispersed locations, allowing students to learn anytime, anywhere, and to re-learn concepts they did not grasp in class. The metaverse also makes it possible to broaden the distribution of utilised materials. The Metaverse's publications may be reused numerous times, the time and place for learning is flexible, the kinds and methods of using copyright materials are various, the number of students and courses is large, and the number of students is not specified and diversified. The convenient reproduction methods of the Internet and the instantaneous means of dissemination

have resulted in new ways of using works and greatly increased the difficulty of controlling them, whereas the traditional classroom has a limited number of students, is predominantly printed and reproduced, and has a smaller space for dissemination, which consequently has a smaller impact on the rights of copyright holders. What's more, the metaverse Moocs are a complete departure from the traditional classroom where instructors and students are in the same teaching space for face-to-face lectures, which has a greater impact on copyright holders due to its large-scale, online, and public characteristics. The expanded extent of dissemination of the aforementioned metaverse poses a significant challenge to the fair use of copyright.

In the case of *Zhu Moumou v. An Online Education Technology Co., Ltd.*, the court determined that the unauthorised use of another person's artwork in an online classroom did not constitute fair use. If the infringing act qualifies as fair use, the following elements must be met: first, it must have a specific purpose and scope; second, it must satisfy specific conditions of use; and third, it must have a limited impact on the right holder. Firstly, the artworks were used in an online course, and the majority of unidentified students who purchased the online course had access to the in question artworks via live streaming and replay, which exceeded the scope of "school classroom teaching". Regarding the object of use, the online classroom audience is an indeterminate majority, and the object of use is beyond the purview of "teaching or research staff." Second, the works appeared in online courses, which is extremely likely to cause the works to be widely disseminated in an online environment, and the resulting impact on the copyright owner's interests is plainly substantial. In summation, the Court determined that the alleged infringement did not comprise fair use. The court's analysis of the fair use system for online classes will likely be applicable to future metaverse classes, as metaverse classes will also result in an increase in the dissemination of works. Nevertheless, the extent to which the metaverse classroom and the online classroom have expanded their dissemination reach is not identical, and consequently, the outcomes of the pertinent decisions may vary.

According to Figure 2, more than half of respondents, 63.96%, believe that the metaverse classroom will lead to an expansion of the dissemination of teaching materials, whereas less than half of respondents, 36.05%, believe that the dissemination of the metaverse classroom will not expand, confirming the empirical analysis's conclusion that the dissemination of teaching materials in the metaverse classroom will expand. 35.01% of respondents believe that the scope of dissemination of teaching materials in the metaverse classroom will only expand slightly, while 28.94% believe that the scope of dissemination of teaching materials in the metaverse classroom will expand significantly, indicates that although the metaverse classroom will cause the scope of dissemination of teaching materials in the metaverse classroom to expand, the scope of expansion is relatively small and the impact on copyright holders is slight, leaving room for the application of the fair use system.

3 Three-dimensional heterogeneous algorithm reproduction

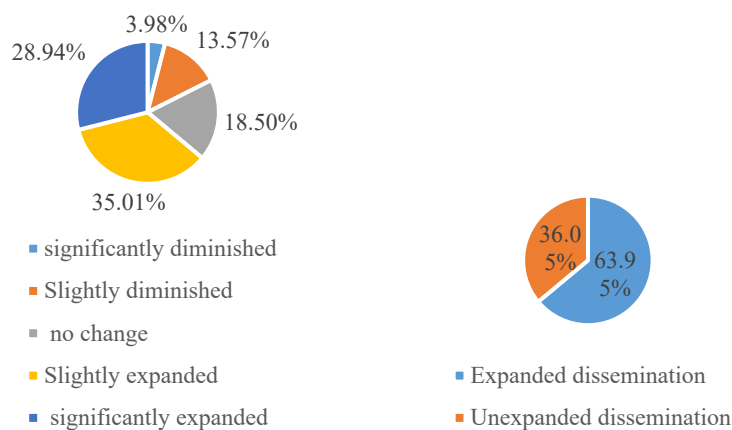


Figure 2 The dissemination of teaching materials shifts in metaverse classrooms

Copyright law does not specify whether the conversion of the intellectual content of courseware, lesson plans, and class schedules created by instructors during lesson preparation from a flat file to a three-dimensional file of the metaverse constitutes reproduction [2]. According to Figure 3, variant duplication algorithm modifies the original work's carrier and expression, shifting the carrier from cyberspace to the virtual space of the metaverse and the expression from a two-dimensional screen to a three-dimensional virtual reality. The reproduced metaverse work differs significantly from the original work, but the substantial creative elements embedded in the work remain unchanged. The process of reproducing teaching materials in the metaverse space meets the three conditions of reproducibility of the work, tangibility of the reproduction vehicle, and non-creativity of the reproduction, according to an analysis of the constituent elements of the act of reproduction in the sense of copyright law.

According to UK copyright law, the duplication referred to in the copyright law includes the stereoscopic duplication of two-dimensional works [3]. This indicates that the UK legislator believes that three-dimensional transformations are not sufficiently original to qualify as deductive works and, as such, should fall under the reproduction provisions of copyright law [4]. Luo Jiao believes that transforming a two-dimensional engineering design drawing into a three-dimensional object is not an act of copying because engineering design drawings are used to manufacture products that correspond to them in order to achieve a specific scientific or technical function, which falls within the dichotomy between idea and expression [5]. There are similarities between metaverse education and industrial drawing, as both are used to produce instructional materials corresponding to planar drawings for educational purposes, regardless of whether they fall within the realm of thought. This paper argues that some of the works used in teaching materials may fall under the category of ideas, and that when converting them into metaverse three-dimensional space, the requirement for originality should be lowered, and as long as they are different, they may not constitute heterogeneous copying but belong to transformative use; while direct transformation without any creativity falls under "reproduction" in copyright law and does not belong to content-based transformative use.

Compared to 3D printing and heterogeneous online instructional copying, the copyrightability of the senses of smell and touch remains an issue in the metaverse. Academic circles have not yet reached a conclusion on whether the use of scent and touch in the metaverse space will violate the copyright of others. The author believes that, within a certain range, copyright law should secure the senses of smell and touch in the metaverse.

Academic circles also debate whether the digital twin image of the teacher in the metaverse is copyrightable and whether it constitutes a heterogeneous reproduction of a portrait. The author believes that the digital twin image is also protected by copyright and that the unauthorised and compensated use of the digital twin image of another person may violate both copyright and portrait rights.

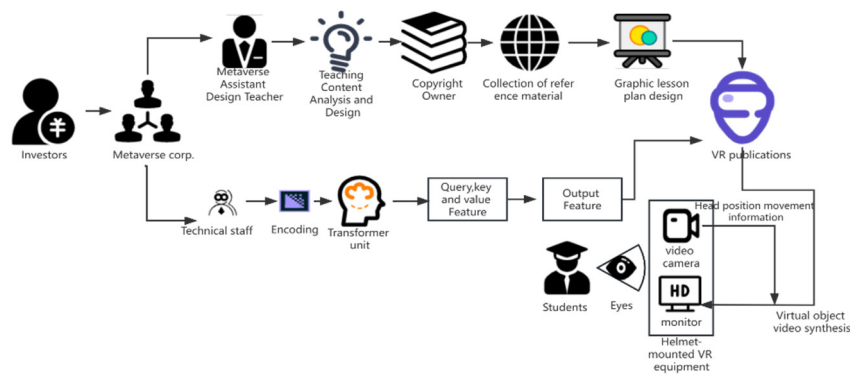


Figure 3 Metaverse Educational Technology and Algorithm Flow Chart Application Analysis

4 Involvement of technical subjects

From the analysis Figure 4 of the questionnaire responses, it can be concluded that the majority of respondents believe that in the future, teachers and metaverse technicians will collaborate to produce metaverse teaching materials, while those who believe that teachers will independently produce metaverse teaching materials rank second, and only a few respondents believe that teachers are unnecessary in the metaverse and that students can learn from the teaching materials produced by metaverse technicians.

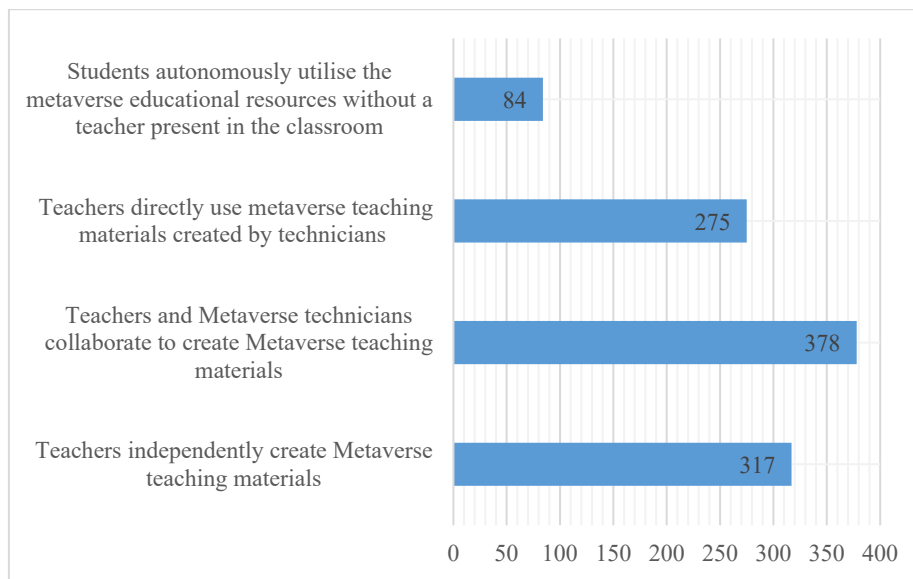


Figure 4 Subject of Copyright Law in Metaverse Classroom

According to Figure 3, the subjects involved in the copyright of the metaverse classroom are the original copyright owner, the library, the teachers and technicians who collaborate in the production of the metaverse teaching materials, the school that submits a bid for the metaverse publication, the metaverse MOOCs platform, and the teachers and students who use the metaverse publication. The problem with the use of teaching materials in the metaverse education stems from the introduction of a technical subject with commercial properties among the three subjects: instructors, students, and the holder of the teaching materials' copyright. In addition to the instructor, the production of Metaverse VR educational materials necessitates the participation of professionals such as virtual reality technicians and CG animation creators [6]. Compared to the traditional paper-and-pencil classroom to the use of digital media, and then to the metaverse classroom, the social division of labour in the education field is getting finer and finer, as the saying goes, there are specialists in the field, and teachers whose primary focus is teaching cannot be expected to master these high-level technologies. Making PowerPoint presentations and learning to use an electronic education system are no longer sufficient. The majority of Metaverse course content is created expensively, difficult to develop, and difficult to popularise software development tools from abroad [7]. There is a misalignment between the majority of those creating instructional materials and the majority of those using them. After the cooperation of multiple parties representing different interests, it is challenging to determine whether these technical subjects who produce metaverse courses are "teaching personnel" as defined by copyright law.

5 Strong commercial nature

In practise, both the design and operation of metaverse classrooms require substantial funds, platform construction, technology updates, management services, and maintenance services [8-

10]. It is difficult to circumvent the commercialization of metaverse education. If the production of VR materials does not generate a profit, fewer investors will invest in metaverse education, hindering its development. Unlike traditional teaching models, metaverse classrooms typically have both educational and commercial profit motives, with VR catechism resources sold to schools for a fee.

Only 19.83% of respondents believe that metaverse classrooms will not be commercialised, while 80.17 % believe that they will be more commercialised than conventional teaching methods. If metaverse classrooms were used in the future, 52.47 percent of respondents believed that parents would be required to pay extra for technological apparatus, while 47.53 percent believed that this would not be the case.

6 Conclusion

The metaverse education poses numerous challenges to the copyright system of fair use application. One is the expansion of dissemination's reach. It is simple to disseminate widely in the online environment because the instructional materials of the metaverse classroom can be applied multiple times and utilised by an undefined audience. Second, heterogeneous reproduction. The materials in the metaverse classroom have been expanded from the two-dimensional plane to the metaverse's three-dimensional world and are therefore utilised differently than in the traditional classroom. Third, the inclusion of technical subjects. As metaverse technology advances, it has become increasingly challenging for teachers to independently create metaverse teaching materials; they must typically collaborate with technical staff, and fair use does not apply to technical subjects. Fourthly, Metaverse education nature is more commercial. The development and maintenance of metaverse education technology is prohibitively expensive and commercial in nature, which is contrary to the original intent of the fair use system. Copyright law must immediately address these issues in order to provide investors, developers, and consumers of metaverse education with clear guidance.

Reference

- [1] Beijing Internet Court Releases White Paper on the Trial of Digital Education Copyright Cases. https://www.thepaper.cn/newsDetail_forward_22753616
- [2] Jarman. An analysis of heterogeneous reproduction. *Journal of Hubei Second Normal College*,2009,26(12):52-53+58. <https://www.cnki.net/index/>
- [3]Section 17(3) of the UK Copyright, Designs and Patents Act of 1988
- [4] Shan Xiaoguang, Yuan Bo. On the "shaped copy" in 3D printing. *Technology and Law*,2017(01):13-19. <https://www.cnki.net/index/>
- [5] Luo Jiao. (2014). A study of the legal aspects of copyright in "3D printing". *Intellectual Property* (08), 41-47. <https://www.cnki.net/index/>
- [6] Lu Zheng. From Extended Reality to Metaverse: A New Trend in the Integration of Education and Digital Technology. *Educational Information Technology*, 2023(Z1):105-109. <https://www.cnki.net/index/>
- [7] CCTV Finance, 2023, "Experiential Teaching System" launched: let the silent classroom "jump". <https://baijiahao.baidu.com>

- [8] Zhai Xuesong, etc. Education Metaverse: Innovation and Challenges of the New Generation Internet Education Form. Open Education Research, 2022,28(01):34-42. DOI:10.13966/j.cnki.kfjyyj.2022.01.004.
- [9] Li Haifeng, Wang Wei. Metaverse + Education: A New Form of Educational Development in the Future by Combining Fiction and Reality. Modern Distance Education, 2022(01):47-56. DOI:10.13927/j.cnki.yuan.20220110.002.
- [10] Cai Su, Jiao Xinyue, Song Bojun. Opening Another Door to Education——Application, Challenges and Prospects of the Education Metaverse. Modern Educational Technology, 2022,32(01):16-26. <https://www.cnki.net/index/>