Using an Artificial-Intelligence-Generated Program for Positive Efficiency in Filmmaking Education: Insights from Experts and Students

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Abstract: In recent years, despite the widespread success of artificial intelligence (AI) across various domains, its full potential in the field of education, particularly in filmmaking education, remains largely untapped. The purpose of this study is to explore the application of AI-generated programs in filmmaking education to address existing shortcomings in curriculum design. We employed a comprehensive approach, starting with an extensive review of existing filmmaking courses and AI-recommended courses. Subsequently, two rounds of in-depth interviews were conducted, involving both experts and students, to gain profound insights. We utilized user journey maps to visualize the participants’ experiences and feedback, complemented by a mixed-methods analysis approach for a comprehensive data assessment. The study revealed that both the experts and the students derived positive benefits from AI-recommended courses. This research not only provides a fresh perspective on the practical applications of AI in filmmaking education but also offers insights for innovation in the field of education. Theoretically, this study establishes a new foundation for the application of AI in education. In practice, it opens up new possibilities for filmmaking education and promotes the development of cutting-edge teaching methods. Despite limitations in sample size and geographical scope, this study underscores the immense potential of AI in filmmaking education. It provides directions for future research to deepen our understanding of AI’s impact on education.

Keywords: design education; artificial intelligence; experience design; positive efficiency; experience journey

1. Introduction

In recent years, artificial intelligence (AI) has witnessed remarkable advancements, revolutionizing various industries and domains, including education [1]. From intelligent algorithms in the financial sector to diagnostic tools in healthcare and autonomous vehicles in transportation, artificial intelligence (AI) has demonstrated immense potential across various domains. However, despite its remarkable strides in many fields, the application of AI in the realm of education has lagged behind [2]. The education sector is gradually realizing that AI can not only be used to optimize school and student management but can also fundamentally transform the essence of education itself. This awareness is driving educators and researchers to actively explore how AI can enhance learning methods, improve curriculum efficiency, and personalize the student experience. The AI’s potential to transform traditional educational practices and enhance learning experiences has sparked interest among educators and researchers. In recent years, large language models like ChatGPT have emerged as prominent representatives in the fields of natural language processing and artificial intelligence. These models have not only achieved significant success in business and research but have also garnered increasing interest in higher education. As a forward-looking educational tool, large language models are reshaping the landscape of
education, fostering innovation in both learning and teaching [3]. Against this backdrop of educational transformation, our focus is directed towards the field of higher education in filmmaking—a domain characterized by creativity, technicality, and constant evolution. Filmmaking is not merely an art but also a technical discipline that integrates literature, visual arts, music, and technology. It stands as an interdisciplinary field in which creativity, technical skills, and adaptability are of paramount importance. Students receiving a filmmaking education must cultivate creativity, master the art of cinematography and post-production techniques, and remain adaptable to the ever-changing preferences of their audience. The integration of AI tools holds the promise to optimize curriculum design and foster personalized learning for aspiring filmmakers and could trigger a fourth educational revolution [4].

It goes without saying that the world is currently experiencing a sustained and ubiquitous technological revolution. Fueled by these technological innovations and ever-evolving audience preferences, the filmmaking industry is dynamic and continuously evolving [5]. The emergence of technological innovations, the rise of digital media, and the diversification of audience preferences have presented both new challenges and opportunities in the field of filmmaking. In order to equip students with the competitiveness required for successful employment, filmmaking education must adapt to these changes to ensure that graduates are capable of performing effectively in a variety of job roles. However, addressing these changes within an educational environment, delivering the required skills and knowledge to students, and designing a comprehensive and highly adaptable curriculum to meet the evolving demands of the industry is a challenging task [6].

The focus of this study is on exploring the potential benefits of incorporating AI tools into higher education in filmmaking to address the aforementioned challenges. Specifically, we aim to investigate how AI-generated advice can improve the effectiveness and timeliness of courses. Our study centers on three fundamental stages of film production education. The basic stage serves as the building block, introducing students to essential concepts and technical skills. Courses in “Audiovisual Language” provide deep understanding of the visual and auditory elements that shape cinematic storytelling, while “Post-production Techniques” equip students with the necessary skills to refine and enhance the final product. The practical stage allows students to apply their knowledge and skills in real-world scenarios. Courses like “Film Production Practice” provide hands-on experiences in various aspects of filmmaking, and “Scriptwriting” nurture creativity and storytelling abilities, which are essential for aspiring filmmakers. Finally, the studio project stage enables students to work on ambitious and collaborative projects. Here, the students can demonstrate their accumulated knowledge and skills in a more comprehensive manner. The “Film Studio Project” course serves as a culminating experience, encouraging students to tackle complex challenges and refine their artistic vision.

To evaluate the impact of AI-generated course recommendations on the curriculum, we conducted interviews with film production experts and students. By showcasing both the original curriculum and AI-recommended alternatives, we sought valuable insights and feedback from participants. The study also involved creating a user journey map to visualize the experts’ and students’ experiences and emotional responses throughout their journey. This research contributes to the ongoing discussion about the use of AI in educational settings and highlights innovative ways to improve the filmmaking curriculum for students. The integration of AI tools is envisioned not as a replacement for educators but as a strategic partnership to support and enhance the curriculum design process [7]. The following sections of this study discuss related research, the research methodology employed in this study, interview findings, and user journey maps. These sections provide valuable insights from experts and students regarding the potential benefits and challenges of using artificial intelligence in filmmaking education. We believe that the findings of this study will provide valuable insights for future research and educational practices. These insights aim to create a more adaptive and empowering learning environment for students.
aspiring to enter the field of filmmaking, enabling them to thrive and embrace the various challenges and opportunities presented by the filmmaking industry.

2. Literature Review
2.1. The Integration of AI into Education

The rapid advancement of artificial intelligence technology has had a profound impact on various aspects of human society, including the economy, social systems, science, and education. AI has been applied to diverse tasks in different domains, such as software engineering [8], data augmentation [9], medical education [10], code generation [11], and autonomous vehicles [12], addressing various AI tasks [13]. In the realm of education, which is our primary focus, the application of AI technology can be traced back to the last century when the first intelligent tutoring system, “SCHOLAR”, aimed to support learning geography and could interact with students to some extent. These early attempts paved the way for the integration of AI technology with education. In recent years, AI has evolved from a mere academic research tool into a powerful ally for both educators and students. AI shows great promise in addressing some of the challenges faced by educators and students, bringing new possibilities to the field of education.

In the current surge in the discussion around the role of AI in education, Moreno-Guerrero et al. analyzed the literature on AI in education based on research published between 1956 and 2019. They found that earlier research focused more on the technical process, but more recent research focused on the development of AI in the teaching process [14]. In recent years, the majority of researchers have focused on the applications of artificial intelligence in various aspects of education. These areas include promoting personalized learning, providing teaching support, managing extracurricular activities, assessing projects, aiding in academic writing and data analysis, offering virtual experiments and simulations, and enhancing plagiarism detection. For instance, artificial intelligence is being used to consider students’ strengths, weaknesses, and individual learning styles, thereby enabling the creation of personalized learning pathways which are tailored to each student’s needs [15]. Education professionals can also harness the power of artificial intelligence for swift assignment assessments, which saves them a significant amount of time [3]. AI is being employed to enhance students’ writing and research skills by providing immediate answers and support for interdisciplinary research projects. This includes features like grammar and spelling checks, which assist students in improving the quality of their writing and reduce inadvertent citation errors, thereby providing robust tools and resources for academic writing and research [16]. By analyzing vast amounts of data from past projects and educational outcomes, AI aids educators in making data-driven decisions to optimize the learning experience [17]. AI-driven virtual environments further enable students to intuitively explore their design concepts, deepening their understanding of spatial relationships and user interactions [18]. Furthermore, artificial intelligence algorithms can assess design projects based on aesthetic principles, usability, and audience engagement [19]. The design recommendations and inspiration generated by AI can expand students’ creative horizons and enhance their ideation phase [20]. When discussing the application of artificial intelligence in higher education, another crucial aspect to consider is its role in plagiarism detection and academic integrity. Artificial intelligence plays a significant role in detecting and preventing academic plagiarism and unethical behavior. It analyzes a submitted text, compares it with extensive literature databases literature, and identifies any similarities. This plagiarism detection not only helps uphold academic ethics but also provides educational institutions with effective means to ensure academic integrity [21]. Conversely, many researchers also focus on issues of ethics and integrity with respect to the use of artificial intelligence for academic writing, sparking extensive discussions [22–24]. For the convenience of researchers, we summarized a list of some research articles on the use of AI in higher education in Table 1.
We primarily focused on the use of artificial intelligence in course-related tasks in higher education. Some researchers have experimented with using AI to create course outlines for specific courses. For instance, they have asked ChatGPT to “prepare a detailed syllabus for the Algorithm and Data Structures course.” ChatGPT can generate a comprehensive outline for the course, including topics, subtopics, and learning objectives [44]. Additionally, some researchers have explored the use of artificial intelligence in career-planning courses in higher education. They employed AI to recommend courses to students and conducted intergroup experiments. The results revealed that the AI recommendations positively impacted the students’ learning and career planning [45]. Due to the novelty of the topic and the fact that most researchers have been focusing on applying artificial intelligence in areas like personalized learning, teaching and academic support, and plagia-

<table>
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<th>Table 1. List of articles addressing the use of AI in higher education.</th>
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<td>Category</td>
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<td>Plagiarism</td>
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2.2. Filmmaking Education and the Integration of AI into Education

Over the years, the field of filmmaking education has witnessed significant development. Filmmaking is a unique and creative art form that holds a special place in the realm of creative expression. It encompasses a wide range of design elements, from scriptwriting and set design to cinematography and visual effects, and each aspect requires meticulous planning to convey specific emotions and stories [46]. Education plays a pivotal role in nurturing talent for filmmaking, providing the necessary knowledge and skills that enable creators to effectively utilize design elements to convey their creativity. It encompasses not only technical training but also the cultivation of creative thinking and storytelling, which are vital aspects of filmmaking [47]. Students will explore various aspects of filmmaking, including scriptwriting, cinematography, sound design, and editing. They will apply theoretical concepts to real-world scenarios through individual or collaborative projects [48].

The field of filmmaking education also faces a series of challenges, including the rapid evolution of digital tools and technologies, as well as the importance of project management in filmmaking. The emergence of new post-production software and visual effects tools demands that students master these tools to remain competitive in the future filmmaking industry [49]. The integration of Virtual Reality (VR) and Augmented Reality (AR) technologies poses new challenges for filmmaking education as students need to understand how to create within virtual environments [50,51]. The emergence of new technologies and tools has expanded the possibilities of filmmaking. However, facing this array of technologies, there is a concern about whether students might become overwhelmed during their filmmaking education. How can a balance be struck between teaching these technologies and nurturing creativity within the constraints of the students’ limited curriculum [52]? In addition, project management in the field of filmmaking is an aspect that cannot be overlooked [53]. Students can learn how to analyze film data and collaborate with colleagues on film projects. Many professionals in the film industry have faced a lack of competitiveness upon entering the field due to inadequate preparation in these essential skills during their education. The current curriculum models in university filmmaking programs shape the professional learning of future filmmakers. To ensure that they can adapt to the constantly evolving film industry, we must be vigilant about existing models. In order to provide students with the most meaningful and suitable educational environment, we need to be willing to break free from restrictive frameworks and rigid assessment methods within the education system [54].

2.3. The Role of AI in Enhancing Filmmaking Education

The interaction between filmmaking and artificial intelligence (AI) has a rich history and an evolving present. As far back as the 1950s and 1970s, the filmmaking industry was exploring the potential of AI technology, using computer-generated special effects and animations, as seen in the 1968 film 2001: A Space Odyssey [55]. The 1980s and 1990s witnessed the rise of Computer-Generated Imagery (CGI), which provided new visual possibilities for filmmaking. The emergence of this technology allowed filmmakers to create visual effects that were previously impossible, as seen in films like Jurassic Park, which featured lifelike dinosaurs [56]. Indeed, while these effects were primarily based on programming and algorithms, they can be seen as precursors to AI technology. With the rapid advancement of computer technology, AI has been extensively utilized in various post-production aspects of filmmaking in the 21st century. These include audio and video editing, color correction, visual effects composition, and scene generation [57]. Furthermore, AI has also begun to make its mark in the composition of film music, generating original music by analyzing emotions and plotlines [58]. In recent years, AI technology has even ventured into the realms of generating movie scripts and designing characters [59].
Film recommendation systems have also harnessed the power of AI, personalizing movie recommendations through the analysis of viewer data [60].

Despite the current limitations of AI technology, the scope of AI applications in the field of filmmaking is continuously expanding. This trend presents innovative opportunities for filmmaking and foreshadows AI’s continued significance in movie production in the future.

AI not only plays a role in the filmmaking process but also offers interesting applications in filmmaking education [61]. The field of filmmaking education has been constantly seeking innovative teaching methods and tools to adapt to evolving industry demands. The rapid development of artificial intelligence technology has brought new opportunities and challenges to filmmaking education [62]. In filmmaking education, AI can analyze students’ learning habits, interests, and academic backgrounds to provide personalized course recommendations which are tailored to each student’s learning needs. This personalized learning path can enhance students’ motivation and engagement. Additionally, AI can predict the skills and knowledge that might be needed in the future by analyzing trends and developments in the film industry. This information can assist educational institutions in adjusting their course content to align with industry demands [63]. However, as we discussed earlier in a general context about the integration of AI into education, the academic literature on AI’s involvement in course design in higher education is very limited, and even fewer resources are available regarding course design in filmmaking education. The introduction of AI into filmmaking education has sparked discussions among many researchers, including concerns about the reliability and accuracy of the technology [57]. Questions about whether AI’s recommendations genuinely suit each student and how AI ensures its suggestions are based on accurate data and analysis are essential considerations. Furthermore, while AI can provide insights into course design, the experience and creativity of human educators remain indispensable in the course design process [64].

The use of artificial intelligence to assist in developing more effective and relevant courses in curriculum design and educational planning has the potential to significantly enhance the quality of film production education.

3. Method

An overview of this study’s research methodology this study is shown in Figure 1. In order to achieve a more global and generalized perspective, we conducted desk research on prominent universities in China, Europe, and the United States which are known for their influential filmmaking programs. The United States, Europe, and China represent different cultures, educational systems, and methodologies, and different regions may influence the content and methods of filmmaking education. Therefore, universities in different cultural contexts can provide diversity and contribute to the understanding of cross-cultural differences in filmmaking education. The United States, Europe, and China each have significant influence and representation in the field of filmmaking. The selection of these universities for study facilitates the identification of key global trends and developments in filmmaking education for the purpose of obtaining more comprehensive, diverse, and representative data and insights.

The desk research focused on dissecting the filmmaking education process into three stages: basic, practice, and studio. Within each stage, we identified the key courses offered by these comprehensive universities. Subsequently, we sought an AI program’s recommendations for course enhancements, and the AI provided its insights.

3.1. Filmmaking Education in Prominent Universities

First, we selected universities with top overall scores in each region based on the QS World University Rankings by Subject Classification. Secondly, the topic of our study included filmmaking education and AI. Considering that filmmaking is a comprehensive discipline, we excluded specialized colleges like the American Film Institute from our examination of candidate universities, and we also considered whether any of the candidate
universities had established AI-related majors; this consideration also encompasses our possible future research on the combination of AI with specific curricula in filmmaking majors. In the examination of candidate universities, we also considered factors such as whether we could find the real curriculum of these universities, the talents trained in the film industry, and so on. Over the course of conducting the desk research, we identified two universities in each of the three regions. They are New York University (US), the University of Southern California (US), the University of Bristol (Europe), Bath Spa University (Europe), Beijing Normal University (China), and the Communication University of China (China). We collected the courses offered by these universities at different stages of filmmaking education and selected core courses at each stage.

Figure 1. Research method.

3.1.1. Basic Stage Courses

At the foundational stage, universities lay the groundwork for their students’ cinematic journey. Core courses often include the following:

- Directing language and technique;
- Editing and post-production;
- Screen performance;
- Digital creativity and content creativity.

3.1.2. Practice Stage Courses

The practice stage is when students apply theoretical knowledge to hands-on filmmaking experiences. Courses in this stage comprise the following:

- Script writing;
- The production of short films;
- Practicum in cinematography;
- The production of short films.
3.1.3. Studio Stage Courses

The studio stage involves more complex projects and collaborative endeavors. The courses offered at this stage encompass the following:

- Directing and film creation;
- Documentary creation;
- Cinematic arts laboratory;
- Collaborative group projects;
- Industrial research projects.

The main courses for each of the three phases are shown in Table 2 by university region.

Table 2. Desk research.

<table>
<thead>
<tr>
<th>Area</th>
<th>Basic</th>
<th>Practice</th>
<th>Studio</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Directing Language and Technique</td>
<td>Editing and Post-Production</td>
<td>Script Writing</td>
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<tr>
<td>China</td>
<td>China</td>
<td>China</td>
<td>China</td>
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<tr>
<td>Europe</td>
<td>Europe Digital Creativity and Content Creativity</td>
<td>Europe Digital Creativity and Content Creativity</td>
<td>Europe Digital Creativity and Content Creativity</td>
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<td></td>
<td>China Directing Language and Technique</td>
<td>China Directing Language and Technique</td>
<td>China Directing Language and Technique</td>
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<tr>
<td></td>
<td>China Editing and Post-Production</td>
<td>China Editing and Post-Production</td>
<td>China Editing and Post-Production</td>
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<td></td>
<td>China Script Writing</td>
<td>China Script Writing</td>
<td>China Script Writing</td>
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<td>China Production of Short Films</td>
<td>China Production of Short Films</td>
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<td>China Directing Film Creation</td>
<td>China Directing Film Creation</td>
<td>China Directing Film Creation</td>
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<td></td>
<td>China Documentary Creation</td>
<td>China Documentary Creation</td>
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<td></td>
<td>China Collaborative Group Projects</td>
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<td></td>
<td>China Industrial Research Projects</td>
<td>China Industrial Research Projects</td>
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3.2. AI Recommendations for Course Enhancement

In this phase, we employed the capabilities of the AI (ChatGPT) to propose potential improvements for the existing courses. When we initially asked ChatGPT about its recommendations for filmmaking education, we attempted to ask ChatGPT directly what courses are important in a filmmaking major’s curriculum, but ChatGPT’s initial response did not satisfy us, and it listed almost all of the types of courses that filmmaking majors would take in university, as shown in Figure 2.

This generalized response did not help much in the attempt to integrate AI into filmmaking education. In addition to asking ChatGPT which courses are important, we tried asking it what dimensions the courses in the filmmaking program can be categorized into, and what the core courses are in each dimension. With the addition of commands such as “categorize” and “dimensions”, ChatGPT’s responses were more accurate than the initial responses, as shown in Figure 3.

After several attempts, it was found that the AI ChatGPT provides more effective advice with accurate instructions. We decided to allow ChatGPT to provide recommendations for filmmaking education based on our desk research, as in Figure 4.

After ChatGPT provided its recommendations for the curriculum in filmmaking education, we asked it again about its reasons for providing such recommendations, which were organized and presented to the experts and students via the interviews. The Q&A with ChatGPT is shown in Figure 5, and to increase its readability, we also included part of the text from the process of interacting with ChatGPT in the Appendix B.

The AI, with its analytical prowess, recommended adjustments that could align courses more closely with industry trends and emerging technologies. Realistic courses and the AI tool’s responses for courses are shown in Table 3.

3.3. Research Design

The research method of conducting in-depth interviews was used in this study to obtain qualitative data; this involved a comprehensive, two-round interview process. The objective was to gather insights from both industry experts and filmmaking students regarding the potential enhancements to filmmaking education achieved using AI recommendations.
In a university filmmaking major, the most important courses typically include the following:

1. **Filmmaking and Directing Courses**: These courses teach the core skills of filmmaking, including directing, cinematography, screenwriting, producing, and editing. Students learn how to conceptualize, plan, and execute film projects.

2. **Screenwriting Courses**: These courses teach students how to write various types of scripts, including plot development, character creation, and dialogue writing. A well-crafted script is the foundation of a successful film.

3. **Cinematography and Camera Courses**: Students learn techniques in cinematography, lens selection, camera operation, and lighting setups to effectively capture visual storytelling.

4. **Editing and Post-Production Courses**: These courses cover the post-production process of filmmaking, including film editing, visual effects, sound design, and scoring.

5. **Film Analysis and Criticism Courses**: Students learn how to analyze films and understand the history, theory, and aesthetic principles of filmmaking. This helps them develop critical thinking about films and insights into their own creative work.

6. **Film Production Practicum Courses**: These courses often involve hands-on experience in producing short films or projects, from creative conception to the final product.

7. **Film History and Theory Courses**: These courses explore the history of film, genres, cultural influences, and theoretical frameworks, helping students understand the evolution and diversity of cinema.

8. **Acting Courses**: Particularly for directors and those interested in working with actors, acting courses can improve performance skills and directorial guidance.

These courses typically form the core curriculum of a filmmaking major, providing students with the necessary skills and knowledge to prepare for their careers. However, the specific course offerings can vary by university and program, so students should research the course requirements and content of each school when selecting their major and institution.

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**Table 3. Realistic courses and the AI tool’s response to the course.**

<table>
<thead>
<tr>
<th>Area</th>
<th>Basic</th>
<th>Practice</th>
<th>Studio</th>
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<tbody>
<tr>
<td><strong>China</strong></td>
<td>Directing Language and Technique</td>
<td>Editing and Post-Production</td>
<td>Script Writing</td>
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<tr>
<td></td>
<td>Photography and Imaging</td>
<td>Cinematic Communication</td>
<td>Practicum in Cinematography</td>
</tr>
<tr>
<td><strong>US</strong></td>
<td>Digital Creativity and Content Creativity</td>
<td>Screen Performance</td>
<td>Scripting for the Screen</td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td>Appreciation of Film Art</td>
<td>Fundamentals of Film Choreography</td>
<td>Scriptwriting and Analysis for film</td>
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**Figure 2.** Course improvement recommendations generated through ChatGPT-3.5 1.
How many dimensions can a course of study in a filmmaking major at a university be categorized into?

A course of study in a filmmaking major at a university can be categorized into several dimensions, typically covering a range of knowledge and skills areas. While the exact number of dimensions may vary depending on the university and the specific program, here are the primary dimensions commonly found in filmmaking majors:

1. Core Production Skills:
   - Directing and Screenwriting: Focusing on the skills of film direction and scriptwriting, teaching students how to conceptualize stories and translate them into scripts before directing the actual shooting.
   - Cinematography and Camera Operations: Covering cinematography techniques, camera operation, lens selection, and lighting skills to effectively capture visual narratives.
   - Editing and Post-Production: Teaching students film editing, visual effects, sound design, and music composition for post-production processes.

2. Creative and Artistic Aspects:
   - Screenwriting: Teaching students how to create stories, characters, and dialogues and construct engaging plots.
   - Art and Design: Including art direction, costume design, and set design for building the visual elements of a film.
   - Music and Sound Design: Focusing on how to use music and sound to enhance the emotions and atmosphere of a film.

3. Theory and Analysis:
   - Film History and Theory: Covering the history, culture, and theoretical frameworks of film, exploring the evolution and diversity of the art of cinema.
   - Film Analysis and Criticism: Teaching students how to analyze films and present critical viewpoints, fostering critical thinking about cinema.

4. Production Practices:
   - Production Labs and Projects: Providing students with practical experience through actual filmmaking projects, from creative concepts to final productions.
   - Acting Directing: For students interested in directing actors, this dimension involves learning how to guide and direct performances.

5. Film Industry and Business:
   - Producing and Film Management: Teaching how to plan, budget, and manage film production projects, including legal and business aspects.
   - Marketing and Film Distribution: Understanding how to market and distribute films to audiences, including marketing strategies, distribution, and programming.

These dimensions collectively provide students with a comprehensive education in filmmaking, covering creative, technical, theoretical, and industry-related aspects. Universities may integrate these dimensions differently, and the specific courses offered can vary between programs. Students often choose courses based on their interests and career goals within the field of filmmaking.

Figure 3. Course improvement recommendations generated through ChatGPT-3.5.

The research design centered on the collection of qualitative data through semi-structured interviews. The interviews were conducted on a one-to-one basis, using a semi-structured methodology, and were limited to 40 min per interviewer. This allowed for a consistent set of core questions while also permitting flexibility to explore unique perspectives. The interview questions were customized according to the expertise of each group of experts and students, and an Interview Guide containing the contents of the interviews is attached as Appendix A.
After ChatGPT provided its recommendations for the curriculum in filmmaking education, we asked it again about its reasons for providing such recommendations, which were organized and presented to the experts and students via the interviews. The Q&A with ChatGPT is shown in Figure 5, and to increase its readability, we also included part of the text from the process of interacting with ChatGPT in the Appendix B.

Figure 4. Course improvement recommendations generated through ChatGPT-3.5.

3.4. First-Round Interviews: Industry Experts

In the first round, we invited eight highly experienced experts from the filmmaking and education industries. To begin, we applied strict criteria during the sample selection process to ensure that our sample was sufficiently diverse and representative. We made an effort to include participants from a variety of geographic locations, cultural backgrounds, and educational levels, and we sought out interviewees from universities that were on the top list of filmmaking programs at comprehensive universities in each region. Secondly, we used a random sampling method by sending out e-mails to potential participants related to filmmaking inviting them to take part in this study to ensure that each potential participant had an equal opportunity to be included in the study. These experts possess a deep understanding of industry trends, technological advancements, and pedagogical practices.
The interviews were aimed at extracting the experts’ insights into the existing filmmaking education landscape and their thoughts on the integration of AI-driven enhancements. Interviewer profiles are shown in Table 4.

Figure 5. Course improvement recommendations generated through ChatGPT-3.5.
Table 4. Overview of the respondents’ profiles.

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<tr>
<th>ID</th>
<th>Occupation/Field of Work</th>
<th>Profile</th>
<th>Experience in Using AI</th>
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<tbody>
<tr>
<td>IntE-1</td>
<td>University teacher; musician; director; script writer</td>
<td>PhD in music; 10 years in soundtrack production, film production creator</td>
<td>Familiar with AI practices and has experience with using AI for scriptwriting</td>
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<tr>
<td>IntE-2</td>
<td>University teacher; product designer</td>
<td>PhD in interaction design; 10 years of experience in prop making</td>
<td>Familiar with AI practice, has their own product design AI database, and is a technology enthusiast</td>
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<tr>
<td>IntE-3</td>
<td>University teacher; brand designer</td>
<td>PhD in interaction design; experience in film branding design</td>
<td>Familiar with AI practices but experience is limited to text-generation AI</td>
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<tr>
<td>IntE-4</td>
<td>University teacher; film director</td>
<td>PhD in interaction design</td>
<td>No experience with AI</td>
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<tr>
<td>IntE-5</td>
<td>University teacher; film director</td>
<td>PhD in artistic business; 14 years teaching film production courses at universities, directs films</td>
<td>Familiar with AI practices and has tried various AI tools in film production</td>
</tr>
<tr>
<td>IntE-6</td>
<td>University teacher</td>
<td>PhD in cinematography</td>
<td>Familiar with AI practices but limited to text-generation AI</td>
</tr>
<tr>
<td>IntE-7</td>
<td>University teacher</td>
<td>PhD in interaction design</td>
<td>Familiar with AI practices and has tested various AI tools in filmmaking</td>
</tr>
<tr>
<td>IntE-8</td>
<td>University teacher; visual communication designer</td>
<td>PhD in interaction design; 6 years of teaching experience in the Cinema Department</td>
<td>Familiar with AI practices and has tested various AI tools in filmmaking</td>
</tr>
<tr>
<td>IntS-1</td>
<td>University student majoring in film production</td>
<td>Has 3 years of learning experience in filmmaking</td>
<td>Has tested AI in several aspects of filmmaking</td>
</tr>
<tr>
<td>IntS-2</td>
<td>University student majoring in animation film</td>
<td>Has 4 years of learning experience in film animation</td>
<td>Has tested AI in several aspects of film animation</td>
</tr>
<tr>
<td>IntS-3</td>
<td>University student majoring in film directing</td>
<td>First-year student in the Film Directing Program</td>
<td>No experience with AI</td>
</tr>
<tr>
<td>IntS-4</td>
<td>Master’s degree student at a university, earning a master’s degree in filmmaking</td>
<td>Has 5 years of learning experience in filmmaking</td>
<td>Familiar with AI practices and has tried various AI tools in Filmmaking</td>
</tr>
<tr>
<td>IntS-5</td>
<td>University student and filmmaking graduate</td>
<td>Has 4 years of learning experience in filmmaking</td>
<td>Familiar with AI practices but limited to text generation AI</td>
</tr>
<tr>
<td>IntS-6</td>
<td>University student majoring in directing animation</td>
<td>Has 2 years of learning experience in directing animation</td>
<td>No experience with AI</td>
</tr>
<tr>
<td>IntS-7</td>
<td>Pre-master’s degree student majoring in filmmaking</td>
<td>Has 7 years of learning experience in filmmaking</td>
<td>Tried AI in several aspects of Filmmaking</td>
</tr>
<tr>
<td>IntS-8</td>
<td>University student majoring in filmmaking</td>
<td>Has 4 years of learning experience in filmmaking</td>
<td>Familiar with AI practices but limited to text generation AI</td>
</tr>
</tbody>
</table>

3.5. Second-Round Interviews: Filmmaking Students

The second round of interviews involved eight students who were in the process of or had just received a higher education degree in filmmaking. These interviews aimed to capture each student’s viewpoint on their learning journey, the relevance of current courses, and their perceptions of AI’s potential impact on their education and future career.

3.6. Data Analysis

We also used a variety of data collection methods, including qualitative methods, such as the insights of the experts and students in the in-depth interviews, and quantitative methods, such as their ratings of the AI’s recommendations for the different stages of filmmaking, in order to gain a more comprehensive understanding of the research questions.
The collected interview data underwent a rigorous qualitative analysis. A thematic analysis was employed to identify recurring patterns, key insights, and overarching themes. This process involved the following steps:

- Data familiarization: transcriptions of the interviews were reviewed multiple times for the researchers to become immersed in the data;
- Initial coding: meaningful segments of data were assigned initial codes, capturing key ideas and concepts;
- Theme generation: the codes were grouped into potential themes based on shared concepts or sentiments;
- Theme refinement: the themes were refined through continuous review, ensuring that they accurately represented the data;
- Theme clustering: the themes were clustered to generate comprehensive insights and meaningful patterns.

3.7. Ethical Considerations

The interviews conducted in this research adhered to strict ethical considerations to ensure the well-being and privacy of the participants. All participants, including the experts and students, provided informed consent which outlined the purpose, procedures, and voluntary nature of their participation in the study. They were assured of their anonymity, and their identities remained confidential throughout the research process. All collected data were assigned unique identifiers instead of using the participants’ names. Any personal information shared during interviews was anonymized in the recording process. Only the research team had access to the raw data, which were securely stored on password-protected devices in compliance with data protection regulations.

Participation in the interviews was entirely voluntary, and the participants were informed that they could withdraw from the study at any time without any consequences. Great care was taken to ensure that the interviews did not cause any psychological, emotional, or professional harm to the participants. During the informed consent process, the potential benefits of participating in the research, such as contributing to advancements in design education and insights into AI integration, were emphasized. Transparency was maintained throughout the research process, with the participants informed about the research objectives, methods, and potential outcomes.

4. Results

This chapter presents the outcomes derived from the dual rounds of interviews featuring both industry experts and filmmaking students. The culmination of these discussions was encapsulated within User Journey Maps (Figures 6 and 7). Although the universities selected in this study differed in naming the core courses for the three stages of filmmaking, in general, the course content was similar. More than half of the experts and students who participated in the interviews in this study were from China, so we used the courses from the universities in China as references for the real courses in the Journey Maps. The User Journey Map served as a compelling visual aid that effectively depicted the participants’ narratives and provided the participants’ perspectives on incorporating AI recommendations into filmmaking education in an intuitive manner.

4.1. User Journey Maps: Experts

The User Journey Map, created for industry experts, is a canvas for comparing existing courses with those recommended by the AI. The map not only highlights differences but also reveals “Wow points”—areas in which the experts were interested in the potential of AI—and “Pain points”—areas in which concerns or skepticism arose. Moreover, this map showcases the experts’ feedback on the recommended AI-integrated curriculum and their quantitative evaluation of these recommendations, spanning from −2 to 2. The User Journey Map unfolds as in Figure 6.
Figure 6. Journey Map 1: experts.

4.2. The User Journey Maps: Filmmaking Students

The User Journey Map for students depicts their educational journeys while interweaving their perceptions of real courses and AI-recommended courses. The map also encapsulates the “Wow points” and “Pain points” expressed by the students regarding the recommendations from the AI. The User Journey Map is shown in Figure 7.

4.3. Comparative Analysis

By comparing the Journey Maps of the industry experts and students, this section reveals shared viewpoints and discrepancies. It delves into points of agreement and divergence, shedding light on the perceptions and reservations concerning the integration of AI within filmmaking education. By juxtaposing the “Wow points” and “Pain points” articulated by both the experts and the students in the context of integrating artificial intelligence (AI) into filmmaking education, a nuanced understanding of their perceptions regarding AI’s role in education can be gained. The analysis highlights both shared perspectives and notable divergences, shedding light on the underlying factors influencing these viewpoints.

Common Perspectives:

Both the experts and students hold a shared appreciation for the emphasis on creativity and technical skills within the AI-generated recommendations for filmmaking education. This commonality reflects a recognition of the foundational role these competencies play in the education and practice of filmmaking. The consensus on the importance of fostering a balance between creativity and technicality underscores the intrinsic link between artistic innovation and technical proficiency in filmmaking.

Divergent Perspectives and Their Reasons:

1. The Integration of Culture and Humanity
Experts’ Wow Point: The experts lauded the AI’s proposition to integrate culture and humanity within filmmaking education. This acknowledgment signifies a comprehensive approach that aligns education with broader societal and cultural contexts.

Students’ Wow Point: While the students also emphasized creativity, their focus was more on creative development within filmmaking itself.

Reasons for Divergence: the discrepancy in emphasis could be attributed to the experts’ holistic perspective, considering the profound impact of culture and humanity on the storytelling aspect of filmmaking. In contrast, students may prioritize immediate practicality and creative exploration within the filmmaking process.

2. Technical Course Insufficiency

Experts’ Pain Point: The lack of emphasis on technical courses was identified as a limitation of the AI-generated recommendations.

Students’ Pain Point: the students echoed the experts’ concern about inadequate technical coverage in the basic stage.

Reasons for Divergence: Both the experts and the students recognized the significance of technical skills; however, the experts seem to perceive the deficiency as a limitation in addressing the industry’s comprehensive needs. Students, as the recipients of the education, may feel the impact of technical course insufficiency more acutely in their learning journey.

3. Timeliness and Real-World Relevance

Experts’ Pain Point: The lag in directing practice caused the experts to worry about whether students would be able to accomplish the goals of the studio stage.

Students’ Pain Point: The students cited concern regarding the AI’s lag in project practice courses.

Reasons for Divergence: The students’ concerns about timeliness and relevance likely stem from their immediate need for up-to-date knowledge and skills to succeed in the rapidly evolving filmmaking landscape. The appreciation for career-related courses implies a proactive stance toward aligning education with practical employment outcomes. From a professional perspective, the experts worried that the lag in directing practices would undermine the students’ success in the studio stage.

In conclusion, while the experts and students share a collective appreciation for the AI’s emphasis on creativity and technical skills in filmmaking education, their differing emphases on cultural integration, technical course coverage, and real-world relevance reflect their distinct perspectives and priorities. The experts’ holistic view considers the broader sociocultural context, while the students’ concerns revolve around immediate practicality and real-world application. Recognizing these shared and divergent viewpoints is crucial for effectively integrating AI into filmmaking education to cater to both the industry’s demands and students’ needs.
5. Discussion

In this chapter, we engage in an exhaustive exploration and explication of the insights garnered from the interviews and User Journey Maps, aiming to contextualize the research findings within the domain of filmmaking education and the broader landscape of the integration of AI tools. Through a revisitation of our research objectives, we gauge the extent to which they were accomplished through this comprehensive investigation. Our study employed a meticulous interview methodology to delve into the application of AI tools in curriculum planning from the vantage points of both industry experts and students in the filmmaking domain. By dissecting the collated interview data, we attain a more profound understanding of the challenges faced in filmmaking education and avenues for potential remedies.

5.1. Findings

Through this research effort, we embarked on a journey to explore the integration of AI tools into filmmaking education. Our research unfolded through careful examination, including interviews with experts and students, the creation of User Journey Maps, and a comparative analysis of their perspectives. Of the eight experts interviewed, seven had a positive view of the use of AI tools in filmmaking education, while one had a negative view. According to the experts, the AI’s focus on creativity and technicality in filmmaking education, as well as the integration of humanity and culture, optimizes the process of filmmaking education to a certain extent. However, the programs created by the AI neglect the accumulation of practical experience, and the proportion of technical courses is small. In the interviews with eight students, six were positive about the use of AI tools in filmmaking education, while two were negative. They believed that AI emphasized the importance of creative development in filmmaking while maintaining a balance between...
creativity and technology and that the AI-recommended project management courses were closely related to their later careers. However, the AI’s recommendations lagged too far behind in terms of project practice, and the technical courses were insufficient; the project management courses recommended by the AI differed significantly in detail from those in real-world environments. In the interviews, both the experts and the students were positive about the use of AI tools in filmmaking education, with entry points focusing on the balance between creativity and technology, and negative about aspects such as the accumulation of practical experience. Our findings reveal a multifaceted dynamic between AI and filmmaking education, highlighting both common and divergent perspectives. In filmmaking education, the curriculum is critical for developing students’ creative, technical, and collaborative skills. However, the rapid evolution of the industry and the diverse needs of students complicate the design and adaptation of curricula. Through interview data, we gained insights from experts and students that reveal the limitations of existing curricula as well as the potential of AI to provide more timeliness and forward-thinking curricular recommendations. Overall, the experts and students identified a positive efficiency in the AI’s recommendations for filmmaking education, and they all agreed that AI really helps in filmmaking education. These data provide us with insights into the gaps in the existing education system. The survey helped identify the potential benefits and challenges that arise when AI intersects with the creative fields of filmmaking education.

5.2. Theoretical and Practical Implications

When comparing our results to the existing literature, we found points of commonality and points of deviation [65]. Our research not only resonates with this sentiment but also delves into specific applications of AI in filmmaking education. This sets our work apart as we explore uncharted territory by scrutinizing how AI tools impact curriculum design and student learning experiences [66]. However, this approach may not adequately account for the latest demands of the industry and the diverse needs of students. By analyzing the interview data, we can identify AI’s to provide more accurate and current curriculum recommendations such as the project management course recommended by AI in this interview, which was positively endorsed by several experts and students and which fills a gap in the existing curriculum and enables education to better meet the needs of the industry and students [67].

5.3. Limitation

While our study offers some insights, we recognize that certain limitations merit discussion. In our study, we paid close attention to and attempted to minimize the effects of selection bias by selecting participants from as many different geographic locations and with as many different cultural backgrounds and educational experiences as possible and by using random sampling to send invitation emails to potential participants. Our participants, while carefully selected, may not include the full range of perspectives from experts and students in the field of filmmaking education. In addition, the rapid development of AI technology introduces complexities that could not be fully incorporated into the scope of this study. For example, ChatGPT, the large language AI model used in this study, was upgraded from ChatGPT3.5 to chatgpt4.0 during the study period. This necessitates ongoing engagement with international AI experts, educators, and professionals in the film industry to remain highly attuned to relevant developments in the field. This is crucial to ensure that curriculum design and development continue to stay at the forefront in an ever-evolving technological landscape. We also recognize that the introduction of AI education is not without its challenges. The balance from technical feasibility to the humanistic aspects of education needs to be explored and researched in greater depth. The use of AI in education will involve a range of moral and ethical issues [68]. Since AI may be used in cheating or plagiarism, threatening the fairness of online exams and quizzes, educators and related organizations must be aware of the lack of fairness resulting from the use of AI. In addition, advanced plagiarism-detection tools may be effective for cheating using
A heavy reliance on AI tools may have a negative impact on education and research. Educators need to carefully consider the impact of AI-recommended curricula on student creativity and critical thinking. It is important to be aware of the limitations when using AI tools and that these tools should only be used as aids to enhance learning and research. At the same time, data privacy and algorithmic bias need to be given sufficient attention. Large language models such as ChatGPT are significantly influenced by training data, which may generate algorithmic bias when the training data contain bias. If these data contain sensitive information, there is a risk of privacy leakage, requiring developers and researchers to strengthen data privacy protection. Also, users need to be cautious when using these models and avoid sharing sensitive information, especially when using large language models in untrusted environments. Regulations and standards in technology ethics and privacy protection are also evolving to ensure people’s privacy and security when using these technologies.

6. Conclusions

This study explored the integration of AI tools into curriculum design within the realm of filmmaking education. Through a comprehensive research process, including desk research, expert and student interviews, and the creation of User Journey Maps, we uncovered the potential of artificial intelligence to enhance filmmaking education. Our investigation provides insights into the intricate interplay between traditional filmmaking education and cutting-edge AI technology, yielding valuable insights. The User Journey Maps vividly illustrate the disparities between existing curricula and AI-recommended modules. These disparities not only reveal gaps in current educational methodologies but also indicate AI’s ability to propose alternative learning trajectories. With the help of artificial intelligence, experts and students show positive efficiency in filmmaking education.

Engaging with experts and students enabled us to assess the reception of AI-driven course recommendations. Expert feedback offered multifaceted viewpoints, acknowledging the potential of AI while recognizing the irreplaceable role of human expertise. Conversely, the students’ interactions with AI’s innovations and their aspirations for a balanced, human-centered learning approach intertwine. Integrating AI tools into filmmaking education will result in an up-to-date and dynamic learning experience. However, cautious steps must be taken, considering ethical dimensions and potential pitfalls. Responsible AI usage characterized by transparency, fairness, and accountability should guide the implementation of AI-driven educational strategies.

As we conclude this research, we acknowledge that our exploration merely scratches the surface of the profound transformations AI can bring to filmmaking education. The synergy between human creativity and AI’s analytical capabilities is pivotal in shaping a new era of learning. This journey underscores the significance of effective guidance from educators, technologists, and visionary thinkers in advancing education.

Fundamentally, this study acts as a catalyst for further delving into the role of AI in education. Our findings call for collective dialogues among educators, educated peoples, decision makers, and researchers to harness the potential of artificial intelligence while preserving the essence of human-centric education. As we stand on the cusp of an AI-driven educational revolution, let this study serve as a beacon for exploring the uncharted waters of a transformed educational landscape.

Looking ahead, the integration of AI with filmmaking education remains a dynamic area for further exploration. The future of filmmaking will increasingly involve interdisciplinary collaboration and innovation. AI not only has applications in filmmaking itself but can also drive the integration of filmmaking into other fields. For example, collaborations with computer science, data analytics, and virtual reality may lead to more creative and technologically in-depth films. The introduction of AI may reshape the traditional paradigm of education. Educators will move beyond being simply transmitters of knowledge and become more mentors and partners. AI may also provide data support between educators and students, helping educators to better understand the progress.
and needs of students so that they can better tailor curricula and teaching methods [75]. If we change the parameters of our research, new questions will arise. For example, how will expert and student preferences and perceptions evolve as AI technologies evolve? How can we strike a delicate balance between AI-driven advice and upholding the values of humanistic education? Also, as the filmmaking industry continues to grow, how can AI-enhanced education align with industry needs?

In the quest for knowledge, this study lays the foundation for future research. We will further delve into the implementation of AI-recommended courses in filmmaking education, tracking their impact on student learning outcomes and the evolving demands of the film industry. We will continue to explore the practical application of AI tools in a specific course within a filmmaking program, investigating the key factors influencing the students taking this course and how the AI interacts with these key factors to produce a positive benefit that aligns better with educational objectives. We envision an ongoing dialogue among educators, students, and AI experts, shaping the landscape of filmmaking education and ushering in an era of creative and technological harmony.

In summary, this study reveals the potential of AI tools to revolutionize the field of filmmaking education. By revealing shared perspectives and differences, we contribute to the ongoing discussion about the convergence of technology and creativity. As AI progresses, we hope that this study will serve as a stepping stone toward a more holistic, personalized, and innovative approach to education in the field of filmmaking.

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Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Interview Guide (Experts)

These questions were for reference only, with follow-up questions and in-depth discussions based on each expert’s answers. At the same time, in order to ensure the flow of the interview, the order and content of the questions were flexibly adjusted according to the interview situation.

Background and Introduction
1. Can you briefly describe your background and your experience in filmmaking education?

Curriculum and Objectives
2. In your experience, what are the characteristics of the curriculum in the three phases of filmmaking education: basic, practice and studio?
3. This is the information on the curriculum of filmmaking majors in comprehensive universities in China, the United States, and Europe collected in our desk research for this study, what do you think about these curriculums?
4. This is information about AI’s recommended curriculum for filmmaking education, how do you think AI’s recommendations compare to the real curriculum?
5. What aspects of a filmmaking curriculum are most important to develop in students? (e.g., creativity, technique, practical experience, etc.)
6. What is the importance of the balance between creativity and technology for student development in filmmaking education?
7. What are some of the issues students may have with the actual film production project management course?

The use of AI in filmmaking education

8. What are your thoughts on the use of AI in filmmaking education?

9. What value do you think AI can provide to filmmaking education?

10. What kind of challenges may filmmaking education face when integrating AI in the future?

Interview Guide (Students)

Background and Introduction

1. Briefly describe your background and your learning experience in filmmaking?

Curriculum and Objectives

2. This is the curriculum information of filmmaking education in comprehensive universities in China, the United States, and Europe collected in our desk research for this study. How are these curriculums in your study experience?

3. This is information about AI’s recommended course curriculum for filmmaking, how do you feel about AI’s recommendations compared to the real curriculum?

4. What aspects of the filmmaking curriculum do you think are most important to your development? (e.g., creativity, technology, hands-on experience, etc.)

5. In the study of filmmaking, which do you think you prefer between creativity and technology?

6. Do you have a course like Project Management for Filmmaking in your program? If so, what problems did you encounter while taking it?

The use of AI in filmmaking education

7. What are your thoughts on the use of AI in filmmaking education?

8. Does AI’s recommendation match your learning interests and direction?

9. You’ve heard in previous interviews what experts think about AI in filmmaking education. Do you share any of these views? Are there some aspects that you have a different view on?

Appendix B. Some of the textual content of the interaction with ChatGPT (Figure 4)

ME:

This is the desk research study we did, it is the subject curriculum of the filmmaking majors in the university in three stages of courses: basic, practice and studio (China; basic stage: Directing Language and Technique, Editing and post-production; practice stage: Script writing, Production of short films; studio stage: Directing Film Creation, Documentary Creation; USA; basic stage: Photography and Imaging, Cinematic Creation; studio stage: Directing Film Creation, Documentary Creation; and studio stage: Photography and Imaging, Cinematic Creation. Writing, Production of short films; Studio stage: Directing Film Creation, Documentary Creation; USA; Foundation stage: Photography and Imaging, Cinematic Communication; Practicum in Cinematography, The Production and Post-Production; Studio: Cinematic Arts Laboratory, Advanced Production Workshop, Workshop; Europe; Foundation Stage: Digital Creativity and Content Creativity, Screen Performance; Practicum Stage: scripting for Screen, Production of short films; Studio Stage: (Collaborative Group Projects, Industrial Research Projects). How would you like to improve the three stages of the curriculum?

CHATGPT:

It appears you are seeking suggestions to improve the three stages of the curriculum for filmmaking majors in universities based on your desk research findings. Here’s a breakdown of potential improvements for each stage:

Basic Stage:
Appreciation of Film Art: Consider including a course that focuses on the history and evolution of cinema, helping students gain a deeper understanding of the medium’s artistic aspects.

Fundamentals of Film Choreography: Introduce a course that covers the basics of film choreography and composition, which are crucial for creating visually compelling content.

Practice Stage:

Scriptwriting and Analysis for Film: Expand the scriptwriting course to include in-depth analysis of film scripts from different genres and eras. This will help students develop a more critical and analytical approach to screenwriting.

Film Photography and Videography: Combine photography and videography into a comprehensive course that covers both still and moving images. This integration can provide a more holistic understanding of visual storytelling.

Studio Stage:

Directing Practice and Film Creation: In the directing practice course, emphasize hands-on experience in directing short films. Provide students with opportunities to apply their skills in real-world filmmaking projects.

Film Practice and Project Management: Introduce a course that not only focuses on filmmaking techniques but also on project management skills. This course can prepare students for the practical aspects of working in the film industry, including budgeting, scheduling, and team management.

These improvements aim to enhance the overall curriculum by offering a more balanced and comprehensive education in filmmaking. They provide students with a solid foundation in film theory and practice while preparing them for the challenges of the film industry.

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