An Exploration of the Application of After Effects in Professional Animation Production (Postprint)

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Abstract

【Objective】 In the context of extensive digital technology adoption, this study focuses on the software characteristics and functions of After Effects, providing a detailed analysis of its application techniques in animation production. It also explores reforms and research related to After Effects in animation education. 【Method】 This article takes After Effects software as the research object, employing research methods including investigation, empirical study, analysis, induction, and exploration, with emphasis on examining the software' s functions and its specific applications in animation production. 【Results】 The study finds that After Effects has demonstrated excellent utility in both 2D and 3D animation production, particularly exhibiting outstanding performance in animation post-production. 【Conclusion】 Developed with digital technology, After Effects has effectively transformed traditional animation production methods, reducing production time and costs while enhancing the audio-visual effects of animation, and has become a compulsory course in animation majors at higher education institutions.

Full Text

Preamble

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Abstract

[**Purpose**] Against the backdrop of widespread digital technology adoption, this study examines the software characteristics and functions of After Effects,

analyzing in detail its application techniques in animation production while exploring reforms and research in animation education. [**Method**] The article focuses on After Effects as the research object, employing investigation, empirical analysis, and inductive exploration as primary research methods to study the software' s capabilities and its specific applications in animation production. [**Results**] The research finds that After Effects demonstrates excellent performance in both 2D and 3D animation production, particularly excelling in post-production phases. [**Conclusion**] Developed through digital technology, After Effects has effectively transformed traditional animation production methods, reducing time and costs while enhancing audio-visual effects, establishing itself as a required course in higher education animation programs.

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Introduction

With the continuous evolution of digital technology and active exploration by artists, the animation industry' s social influence has grown substantially, attracting increasing attention. Animation has expanded from early childhood education to all-age entertainment, from niche aesthetic expression to mainstream social supply services, and from singular artistic representation to a complete industrial chain encompassing upstream, midstream, and downstream sectors. Throughout the animation production industry, high-end computer technologies are continuously integrated to shorten production cycles. Among the many software tools developed through digital technology, After Effects stands out as a graphics and video processing software that serves as an indispensable auxiliary tool for film, television, and animation production. It consistently updates to meet contemporary demands, demonstrating strong performance in both 2D and 3D animation production, particularly in post-production phases. The software' s involvement in various animation production stages has effectively transformed traditional methods and enhanced animation' s audio-visual impact.

1. After Effects: A Graphics Video Processing Software that Visualizes Inspiration

1.1 Development of After Effects

Professionals in motion graphics design are familiar with After Effects, a graphics, image, and video processing software commonly abbreviated as "AE." As an essential auxiliary tool for video production, AE is a layer-based compositing software [1] and currently one of the most influential visual effects tools. The software boasts a long history, originating in 1990 when CoSA began its development. The company was acquired by Aldus in 1993 and subsequently integrated into Adobe in 1994. Having undergone over 30 iterations since 1990, the latest version is Adobe After Effects CC 2023. Throughout this evolution, continuous updates responding to era-specific demands have endowed After Effects with powerful capabilities capable of addressing most motion graphics and video effects challenges.

1.2 Functional Capabilities of After Effects

The power of After Effects is aptly described on its official website: "With After Effects, the industry-standard motion graphics and visual effects software, you can animate any inspiration" [2]. This statement fully demonstrates AE's robust functionality, broad application scope, and diverse editing techniques.

First, like most software, AE includes fundamental features that support its operation: fast and practical preview functions, comprehensive parameter settings, personalized material editing, and flexible time adjustments. However, the core service of these conventional functions is the layer system—all editing work in AE is built upon creating layers, which represents the software' s distinctive characteristic. These layers originate from two sources: some created within the software (shapes, text, lighting, or solid colors) and others imported externally. AE supports most file formats for imported materials and can accommodate additional formats through codec installation. Furthermore, AE can import files from other software or specific elements from those programs as layers, including Photoshop and Illustrator files, Premiere project files, and Premiere .EDL files. It can also recognize CINEMA 4D' s .AEC files, with the 2023 beta version already supporting 3D software' s .glb files. Various layer types undergo meticulous production within the timeline panel through both individual layer properties and inter-layer interactions to meet creators' diverse requirements.

Second, with the development of MG (Motion Graphics) animation, AE has become increasingly prevalent in the industry, with its animation capabilities maturing accordingly. Keyframes serve as the core of animation functionality. After importing materials as layers, animators can adjust values at different time points using keyframes attached to various layer properties, creating animation through value changes between two keyframes over time. Keyframe types include linear, eased, ease-in/ease-out, smooth, and hold keyframes, each

applicable to different scenarios and producing distinct animation effects. The graph editor enables the creation of different rhythms, resulting in more dynamic animations. Additionally, expressions represent a finishing touch for animation functionality—implementing commands unavailable in the interface or automating repetitive operations through programming [3]. After Effects' expressions simplify complex animation production, with commonly used expressions including spring, loop, time, and wiggle expressions. Skillful application of these expressions enables more creative and complex animations, making the software highly versatile in animation production.

However, what maintains AE's position in mainstream post-production software is primarily its effects and presets panel. Beyond hundreds of built-in effects, functionality can be expanded through plugins to meet user needs. This feature supports various effect types, including text animations, layer distortion effects, video image keying, fantastical particle effects, atmospheric color adjustments, and special effects that alter layer appearances such as noise, blur, simulation, generation, perspective, and stylization. These diverse effects establish the critical importance of the effects functionality within AE.

Beyond these capabilities, AE can create track mattes with alpha channels for dynamic footage, apply path-based mask functions to layers, simulate real camera movements, and employ tracking systems to assist with element addition or removal. These complementary functions provide comprehensive video and image editing capabilities.

In summary, After Effects offers countless functions that permeate various video-related production sectors, including animation, film and television, post-production, advertising, program packaging, UI design, virtual reality, and short videos. Its flexible tools enable creators to visualize inspiration, better express ideas, present richer content, and efficiently create countless stunning visual effects. This establishes its solid position in animation visual effects and dynamic content processing.

2. After Effects' Significant Role in Animation Production

Animation has become a popular and influential media form. Its rapid development has made traditional production methods inadequate for current market demands, from early-stage conceptualization through mid-production to post-production. Digital technology has emerged as a specific expressive technique, gradually integrated throughout the entire workflow. After Effects, developed through digital technology, participates in animation production and effectively transforms traditional methods [4], improving production efficiency and audio-visual quality. With increasing demands, AE' s application scope has expanded to 2D animation production, partial 3D animation production, and post-production compositing and effects.

2.1 Performance in 2D Animation Production

AE has gradually become one of the primary software tools in 2D animation production. First, it can create simple element animations or transition animations using graphic editing functions, expressions, keyframes, and relevant effects panel contents. Second, the Puppet Position Pin Tool (manipulation point tool) enables fluid deformation animations by applying control points to key nodes of objects, facilitating simple character movements and joint animations. Third, external plugins and scripts can be utilized, with the most common including Bq HeadRig, Duik Bassel, and Rubber Hose. Bq_{HeadRig} is a character head control script for creating head rotations in multiple directions, achieving 2D character simulation of 3D head movements with simple clicks. Duik Bassel is an essential script for 2D character rigging, widely used in animation character bone binding, featuring inverse kinematics, bone deformers, dynamic effects, automatic bone binding, IK, and graphics capabilities. Rubber Hose is a script for quickly creating 2D character rigging animations without requiring bones, instead controlling entire limb bindings through control points [5]. These scripts make 2D character animation creation easier and more convenient.

In addition to these scripts, other tools like the Auto Sway script and Newton plugin further expand animation capabilities. This series of script and plugin developments has enabled many MG animations to be produced using AE.

2.2 Performance in 3D Animation Production

When considering 3D animation production, specialized software like Maya or 3D Max typically comes to mind. However, AE also has applications in 3D animation. Converting ordinary layers to 3D layers within the timeline window creates a 3D workspace, which, combined with lighting and camera applications, enables motion transformations of different layers in 3D space. AE's 3D concept is essentially "pseudo-3D," differing somewhat from conventional 3D animation [6]. For simple model creation within AE, the Element 3D plugin (E3D) from Video Copilot is required. Element 3D supports basic modeling, texturing, and animation operations and stands as one of the few powerful AE plugins supporting complete 3D rendering features. Another highlight is AE' s seamless integration with Cinema 4D, allowing models created in Cinema 4D to be imported into AE for refinement and fine-tuning. Through such integrations with plugins and software, AE can accomplish various complex 3D post-production compositing effects.

2.3 Performance in Animation Post-Production

When initially developed, After Effects served simple post-production compositing. However, with continuous digital technology advancement, the entire post-production workflow can now be completed within AE. Its powerful functions enable easy execution of post-production editing, effects, and compositing.

First, regarding editing functionality, AE objectively meets basic animation editing requirements. Unlike film and television editing, animation editing differs because most pre-production and mid-production work follows storyboards. Extensive revision of shot sequences during post-production would increase the footage ratio and workload. Therefore, editing primarily focuses on shot 衔接 and minor adjustments, which AE' s basic functions can readily accomplish, including adjustments to shot transitions, picture-sound coordination, and individual shot pacing.

Second, with rapid digital technology development, many traditional animation effects previously requiring filming can now be completed digitally with better results and efficiency [7]. For post-production effects, AE' s built-in effects and external plugins excel, such as the Red Giant Trapcode Suite, which includes 11 plugins covering lighting, 3D animation, particle animation, and audio—comprehensive visual effects tools. The most representative are particle animations, which combine countless individual particles into specific forms controlled through controllers or scripts to simulate special effects, commonly using Particular particles and Form 3D space particles. AE also demonstrates impressive performance in lighting effects: Optical Flares creates realistic lens flare animations, while Saber generates energy lasers, portals, neon lights, electric currents, beams, and lightsaber effects. In post-production effects, After Effects maximizes its capabilities through parameter combinations to present diverse animation post-production effects.

Finally, animation post-production compositing represents a fundamental AE operation. As a layer-based compositing software, AE utilizes relationships between different layers to combine elements such as animation, scenes, effects, text, and sound through keying, tracking, masking, or matting according to shot requirements, followed by color grading based on narrative and atmospheric needs.

Post-production is technically a craft but macroscopically an art form that embodies animation works' value and artistic sensibility. Tool selection is crucial for achieving ideal results, and post-production' s proportion in animation production has grown increasingly significant in recent years. After Effects leverages its powerful functions to easily complete post-production editing, effects, and compositing steps.

In summary, After Effects demonstrates outstanding performance across pre-production, mid-production, and post-production phases. It participates in title and end sequence packaging, MG animation, 2D animation, 3D animation, and post-production work, favored by various animation companies including network animation, 2D animation, 3D animation, and game animation studios. Its widespread industry application has gradually evolved it into a core teaching software for animation curricula in higher education institutions.

3. Reform and Research in Animation Education

With continuous digital technology development, software skills have become essential professional capabilities alongside animation theory and techniques in animation programs. After Effects provides students with important support for animation production and has become a crucial course in animation education curricula.

When offering this course for animation majors, it must align with market demands while conforming to program characteristics. Given the software' s current widespread application, curriculum design should no longer focus solely on animation post-production but should instead provide staged, directional instruction based on its functions and applications. According to surveys, teaching experience, and student feedback, After Effects instruction can be divided into two stages and three directions: the first stage covers software fundamentals, while the second stage provides advanced, specialized instruction in 2D animation production, 3D animation production, or post-production. Both fundamental and advanced stages are critical, directly affecting students' ability to accurately use specific AE functions for animation and effects production.

3.1 Fundamental Software Instruction Stage

The fundamental stage should introduce the software progressively from simple to complex concepts. Content includes interface introduction, basic operations, material utilization, timeline editing, text animation, keyframe animation, masks and track mattes, basic keying techniques, presets and effects panel introductions, basic color correction, and rendering output. This stage provides students with comprehensive software understanding, familiarizes them with AE workflows, clarifies what types of effects and animations can be produced, and ensures mastery of basic operations. Classroom design incorporates numerous practical cases to enhance student interest and software applicability, enabling students to create visually innovative animations efficiently and accurately after completing fundamental training.

3.2 Advanced Software Instruction Stage

The advanced stage represents a learning challenge, requiring categorized instruction based on different AE applications. Currently, AE can produce 2D animation, 3D animation, and post-production effects. Curriculum arrangement should emphasize directions that interest students.

First, AE' s 2D animation curriculum primarily focuses on MG animation. According to different element production methods, content is divided into text animation, shape animation, object animation, creature animation, expression animation, character animation, and transition animation. This unit requires students to build upon basic understanding of keyframe animation, graphics animation, and text animation for advanced training, with in-depth explanation

of puppet pin techniques and detailed categorization of relevant plugins and scripts by application scope.

Second, AE' s 3D production curriculum includes 3D text animation, 3D object deformation animation, 3D particles, and techniques for combining 3D with live-action footage. This unit focuses on learning 3D-related plugins and how to integrate AE with 3D software.

Finally, the post-production curriculum covers compositing and effects production. The compositing component emphasizes applying AE' s relevant functions to different animation types, while the effects component focuses on learning popular marketplace plugins and scripts and skillfully applying them to animation production.

This course combines numerous practical cases to precisely process various materials with unparalleled effects, creating rich video content. Based on software capabilities, comprehensive and hierarchically clear teaching objectives should be established, employing appropriate teaching methods tailored to individual students. The curriculum enriches project case resources, strengthens practical components, creates better learning environments, improves assessment methods, and encourages students to pursue independent innovation using acquired knowledge, thereby optimizing instruction.

In today's digital information society, animation has become a popular and influential media form. Its rapid development has made traditional production methods inadequate for current market demands. Digital technology has emerged as a specific expressive technique integrated throughout the entire workflow. After Effects, developed through digital technology, effectively transforms traditional animation production methods, saving time and costs. With increasing demands, After Effects has become a required professional course in higher education animation programs—a comprehensive course combining art and digital technology. Through exploration of software functions and techniques alongside research on application directions, diverse teaching methods can be developed from different pedagogical perspectives. Curriculum design should meet market demands, teaching cases should align with contemporary aesthetics, and instructional content should conform to software operation techniques. This approach better accomplishes teaching tasks while enabling students to master professional knowledge and practical skills, stimulating learning interest and fostering exploration of After Effects' applications in animation classroom instruction.

References

[1] Wang Ruizhi. *After Effects Film and Television Special Effects Design and Production* [M]. Shijiazhuang: Hebei Fine Arts Publishing House, 2018: 2.
[2] Adobe Official Website [EB/OL]. https://www.adobe.com/cn/products/aftereffects.html.
[3] Zhang Baosheng. Design and Implementation of Simulation Animation Based on After Effects Expressions [J]. *Computer Programming Skills & Maintenance*, 2021(5): 139-141.

[4] Liu Chang. The Impact of Digital Media Technology on Animation Design [J]. *China Media Technology*, 2021(5): 43-45.
[5] Deng Xingxing. Research on Character Limb Rigging Technology in MG Animation [J]. *Electronic Technology & Software Engineering*, 2021(1): 144-145.
[6] Qu Yanmei. Analysis of After Effects Application in 3D Animation Production [J]. *Heilongjiang Science and Technology Information*, 2013(11): 156.
[7] Men Fei. Application of Digital Media Technology in Film and Animation Post-Production [J]. *Wireless Internet Technology*, 2022(8): 102-103.
[8] Shui Xiaoxia. Application of Adobe After Effect in Film and Television Post-Production [J]. *China Media Technology*, 2014(8): 64.

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Note: Figure translations are in progress. See original paper for figures.