DEVELOPMENT AND EFFECTIVENESS OF ANIMATION TEACHING SYSTEM BY INTEGRATING EDUCATIONAL APPROACH TECHNIQUES FOR ANIMATION EDUCATION IN LESS DEVELOPED PROVINCES IN CHINA

By

WANG XUEFENG

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

December 2023

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DEDICATION

This thesis is dedicated to:
my favorite wife Kuang Sha, and baby on the way
my dear parents, Xin Wang and Lixia Yin,
my dear brother, Qingfeng Wang,
my big family, and my dear friends
for their love and strong support.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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The Chinese government has been supporting the animation industry as part of its national economic transformation plan since the early twenty-first century. The establishment of animation parks in major cities across the country, such as HuaChuang Animation Industrial Park in Guang Zhou, LuoYang Animation Industrial Park in Luo Yang, and Hua Xia Animation Industrial Park in Shen Zhen, has resulted in an increase in demand for local talent and the growth of Chinese animation education. The modern history of animation education in China began with the first undergraduate animation program offered at Beijing Film Academy in 2000. By 2007, about 1,230 universities offered animation-related majors. Despite this, the number of universities offering animation programs in China dropped by 22 percent since 2007, with almost 100 animation majors cut by 2018. This drop reflects the specific issue of insufficient animation education, which hinders local graduates from meeting the industry's expectations for competitive animation talent. The issue highlights the problem of teaching quality in animation education in China.

Against this research background, this thesis outlines three main research issues: the lack of animation education research in Chinese universities based on different city levels and regions, the lack of research on Chinese animation pedagogy, and the limited application of design thinking to animation education in China. To address these issues, the study aims to understand animation education issues in Chinese universities, investigate the impact of normal teaching (NT) on animation education, and introduce an animation teaching system (ATS) by integrating design thinking and creative methods into the teaching of animation in China.

The study uses thematic analysis and conducts two quasi-experiments to achieve its objectives. It covers data collection on the numbers of animation majors in universities in China and a systematic analysis of relevant information, such as program enrolment, location, and city level, to understand the current situation of animation pedagogy research in China. Focusing on a specific case study, two separate quasi-experiments are conducted on animation undergraduate students at Kunming University, Yunnan, and Hunan University of Science and Engineering, Hunan. The experiments examine the NT process and the ATS concept, which integrates design thinking and creative methods. The overall data findings from this study are divided into three aspects: the collection of animation programs and other detailed information in universities in China, the collection of experimental surveys during the quasi-experiment, pretest-post-test, and post-experiment feedback.

This thesis highlights the critical problem in recent animation education in China and aims to address it by developing creative animation teaching methods. In underdeveloped areas, normal animation teaching is not well suited to teach students to create animation. Moreover, the market demand for talent far exceeds what is taught in universities. Therefore, ATS was developed in this study to help teachers and students solve this problem, and after analyzing the data from the quasi-experiment, it was concluded that ATS affects the creative ability of students during their creative process. The study contributes to the development of a comprehensive teaching concept for animation that can assist teachers in cultivating creative thinking and ability among students. It is hoped that the study will pave the way for more possibilities in exploring pedagogical issues on animation in particular and the creative industry in general.

Keywords: Animation pedagogy; Design thinking; Creative methods; Animation Teaching System (ATS).

SDG: GOAL 1: Design education; GOAL 2: Animation industry.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

MEMBANGUNKAN SISTEM PENGAJARAN ANIMASI DENGAN MENGINTEGRASIKAN PEMIKIRAN REKA BENTUK DAN KAEDAH KREATIF UNTUK PENDIDIKAN ANIMASI DI CHINA

Oleh

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Kerajaan China telah menyokong industri animasi sebagai sebahagian daripada pelan transformasi ekonomi negara sejak awal abad kedua puluh satu. Penubuhan taman animasi di bandar-bandar utama di seluruh negara, seperti Taman Perindustrian Animasi HuaChuang di Guang Zhou, Taman Perindustrian Animasi LuoYang di Luo Yang dan Taman Perindustrian Animasi Hua Xia di Shen Zhen, telah menghasilkan peningkatan permintaan untuk bakat tempatan dan pertumbuhan pendidikan animasi Cina. Sejarah moden pendidikan animasi di China bermula dengan program animasi ijazah pertama yang ditawarkan di Akademi Filem Beijing pada tahun 2000. Menjelang 2007, kira-kira 1,230 universiti menawarkan jurusan berkaitan animasi. Walaupun begitu, bilangan universiti yang menawarkan program animasi di China menurun sebanyak 22 peratus sejak 2007, dengan hampir 100 jurusan animasi dijumudkan menjelang 2018. Penurunan ini mencerminkan isu khusus berkaitan pendidikan animasi yang tidak mencukupi, yang menghalang graduan tempatan daripada memenuhi jangkaan industri terhadap bakat animasi yang berdaya saing. Isu tersebut mengetengahkan masalah kualiti pengajaran dalam pendidikan animasi di China.

Dengan latar belakang ini, tesis ini menggariskan tiga isu penyelidikan utama: kekurangan penyelidikan pendidikan animasi di universiti China berdasarkan tahap dan wilayah bandar yang berbeza, kekurangan penyelidikan mengenai pedagogi animasi Cina, dan aplikasi pemikiran reka bentuk yang terhad dalam pendidikan animasi di China. Bagi menangani isu ini, kajian ini dijalankan bertujuan untuk memahami isu pendidikan animasi di universiti Cina, memeriksa kesan pengajaran biasa (NT) terhadap pendidikan animasi, dan

memperkenalkan sistem pengajaran animasi (ATS) dengan mengintegrasikan pemikiran reka bentuk dan kaedah kreatif ke dalam pengajaran animasi di China.

Kajian ini menggunakan analisa tematik dan menjalankan dua eksperimen-kuasi untuk mencapai objektifnya. Ia meliputi pengumpulan data mengenai bilangan jurusan animasi di universiti di China dan analisis sistematik maklumat berkaitan, seperti pendaftaran program, lokasi dan peringkat bandar, untuk memahami situasi semasa penyelidikan pedagogi animasi di China. Memfokuskan pada kajian kes khusus, dua eksperimen-kuasi berasingan dijalankan ke atas pelajar sarjana muda animasi di Universiti Kunming, Yunnan, dan Universiti Sains dan Kejuruteraan Hunan, Hunan. Eksperimen tersebut mengkaji proses NT dan konsep ATS, yang mengintegrasikan pemikiran reka bentuk dan kaedah kreatif. Penemuan data keseluruhan daripada kajian ini dibahagikan kepada tiga aspek: pengumpulan program animasi dan maklumat terperinci lain yang berkaitan di universiti di China, pengumpulan tinjauan eksperimen semasa kuasi-eksperimen, pra-pasca ujian, dan maklum balas pasca-eksperimen.

Tesis ini mengetengahkan masalah kritikal dalam pendidikan animasi semasa di China dan bertujuan untuk menanganinya dengan membangunkan kaedah pengajaran animasi kreatif. Di kawasan yang kurang membangun, pengajaran animasi biasa tidak sesuai untuk mengajar pelajar merekabentuk animasi. Lebih-lebih lagi, permintaan pasaran untuk bakat jauh melebihi apa yang diajar di universiti. Oleh itu, ATS dibangunkan dalam kajian ini untuk membantu guru dan pelajar menyelesaikan masalah ini, dan setelah menganalisa data daripada eksperimen-kuasi, disimpulkan bahawa ATS mempengaruhi keupayaan kreatif pelajar semasa proses kreatif mereka. Kajian ini menyumbang kepada pembangunan konsep pengajaran animasi yang komprehensif yang dapat membantu guru dalam memupuk pemikiran dan keupayaan kreatif dalam kalangan pelajar. Kajian ini diharapkan dapat membuka jalan kepada lebih banyak kemungkinan dalam meneroka isu pedagogi animasi khususnya dan industri kreatif amnya.

Kata kunci: Pedagogi animasi; Pemikiran reka bentuk; Kaedah kreatif; Sistem Pengajaran Animasi (ATS).

SDG: MATLAMAT 1: Pendidikan reka bentuk; MATLAMAT 2: Industri animasi.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AE	Animation education
AP	Animation pedagogy
ATS	Animation teaching system
CAT	Consensual Assessment Technique
CG	Control group
CLA	Causal Layered Analysis
CME	China's Ministry of Education
CMIC	The Ministry of Industry and Commerce
DT	Design thinking
DV	Dependent Variable
EG	Experimental group
HE	Happy ending
HUSE	Hunan University of Science and Engineering
HUSECG	Hunan University of Science and Engineering Control Group
HUSEEG	Hunan University of Science and Engineering Experimental Group
IV	Independent Variable
KU	Kunming University
KUCG	Kunming University Control Group
KUEG	Kunming University Experimental Group
NE	Neutral ending
NT	Normal teaching
NTRAC	The National Television and Radio Administration of China
RO	Research objective
RQ	Research question

SARFT	The State Administration of Radio, Film, and Television
SE	Sad ending

CHAPTER 1

INTRODUCTION

1.1 Research Background

The animation industry in China has seen dramatic growth over the past few years. In 2019, a few local animation films broke box office records. For instance, the animation film named *Ne Zha* has gained US$725 million since its opening in July 2019, gaining a place among the highest-grossing animated films ever produced in China's history (Gleiberman, 2019). A similar story can be traced to the box office success of other animation films like White Snake and Abominable, both released in 2019 (Liz Shackleton, 2019). Their remarkable success highlights a promising achievement in paving the way for the animation industry to be a significant player in further boosting China's economic development.

In response to the rising demand for creative talent in the Chinese animation industry, animation education has flourished in many regional cities in China over the past few years. Following that, several studies have been conducted to understand the dynamic issue between the supply and demand for animation education in China. For instance, Cao Xiaohui's study in 2005 highlights the disappointment caused to animation companies because of the training quality of graduates from local universities (Cao, 2005). Feng Su and Xiaoyi Luo, back in 2013, expressed a similar concern through their research on higher education in China. Su and Luo reaffirm the need for maintaining a healthy distance between the supply of animation education and the demand from the animation industry (Su & Luo, 2013). Additionally, a recent study by Xingqi Wang further elaborated on this matter (Wang, 2016). Wang describes the mismatch between most animation skill training programs in China with the current industrial demand. While most previous studies up to this day have mainly focused on curriculum content, little focus has been given to animation education from the perspective of the characteristics of the academic discipline that contains it. The training of animation professionals in Chinese universities depends on each university's training methodology and is also affected by the cultural and financial status of the region in which the university is placed (Gao, 2018; Yin & Qi, 2012; R. Zhao & Li, 2018). Each university's strategic plan will influence the direction of the talent training skills in each course (Guan & Zheng, 2021a), such as academically oriented and professional skills-oriented training. Most animation-skilled individuals who graduate from universities work in professional companies in the industry (D. Chen et al., 2021) instead of the animation academic research field. Moreover, other factors, such as faculty ranking and the dissemination and preservation of the region's culture where each university that accommodates an animation studies field is located, also affect animation skill cultivation. For instance, Ma Tao (2020) explained that universities are responsible for bequeathing intangible cultural heritage to their students.

The above status sets a background for further exploring subjects related to Chinese animation education. Within this context, the present thesis aims to understand the current characteristics of animation education in mainland China. The following section begins with a discussion on the rise of the Chinese animation industry that nurtures the need for animation education. This thesis continues with research on the development of animation programs offered in China. A few emerging issues found from the research conclusions are then highlighted as a main departure point that creates a motive for the work of this thesis study.

1.1.1 Bridging the Industrial Demand and the Supply Side of Animation Education Globally

There is a close and complex relationship between global animation talent training and the needs of the animation industry. First of all, with the progress of science and technology and the development of globalization, the animation industry is rapidly growing (Saputra et al., 2021). In addition to the rapid development of animated movies, TV animation, game animation, and other fields with which the public is more familiar, the development of the animation industry has directly promoted the process of talent training. The industry's demand for talent has changed from single technical talent to complex and innovative talent (Gutierrez Posada & Nathan, 2019). This requires animation talents not only to have solid drawing and production skills but also to have rich cultural literacy, innovative thinking, and teamwork ability. Therefore, major universities and training institutions have offered animation majors, focusing on training students' practical ability and innovative thinking to meet the needs of the industry.

Secondly, the demand for animation talents, in turn, affects the development direction of the animation industry. As the market demand for high-quality, highly creative animation works increases, the industry's selection standards for talents are also constantly improving (Tan et al., 2024). This makes animation talents pay more attention to the improvement of professional skills and the cultivation of innovation ability in the process of training (Guan & Zheng, 2021b). At the same time, the industry also actively cooperates with universities and training institutions to provide internship and employment opportunities to attract more excellent animation talents.

In addition, globalization has also brought new opportunities and challenges for animation talent training, which the animation industry demands. With the increase of transnational cooperation and cultural exchanges, the market for animation works is also expanding. This requires animation talents to have the ability to cross-culturally communicate, have an international vision, and create animation works that meet the needs of different markets. At the same time, the animation styles and technical characteristics of different countries and regions also provide more resources and references for talent training.

However, although the relationship between global animation talent training and animation industry demand shows a mutual promotion, there are still some challenges and problems. For example, the training of animation talents in some regions may lag behind or be insufficient, resulting in the supply of talent failing to meet the industry's demands (Tan et al., 2024); at the same time, some animation talents may not be able to adapt to the development changes of the industry due to the lack of practical opportunities or innovative thinking.

Since the early development of the Chinese animation industry in the mid-90s, animation works in China have largely focused on children as their targeted audience (S. Chen, 2017). While such a focus may restrict creative exploration, it can also limit the financial market share for local animation productions. The situation becomes more problematic with the massive entry of international animation films and cartoon series from abroad into the domestic market scene. Within such a competitive business environment, most local Chinese animation companies have been forced to operate by outsourcing to foreign animation studios (L. Li, 2010). Their work scope mostly involves activities during the production phase, a phase that focuses on key animation, color designation, coloring, special effects, background, and computer graphics (L. Ma et al., 2018). These companies are running counter to the original intention of developing creative industries advocated by the government. Therefore, China's animation industry has long drawn criticism for undertaking outsourcing practices from foreign animation companies. Li Lei-Lei (2010) suggests that this derives from the long undertaking outsourcing practices. According to Li, the foundry operation has ignored the originality aspect of the Chinese animation industry and dampened its full potentiality. This is also happening in the Philippines (Tschang & Goldstein, 2010). Additionally, Li highlights that since the start of the Open Door Policy in 1978, the industry has been engaged in the outsourcing of global animation production (2010: 196-202). It can be seen that the contemporary Chinese animation industry is still lagging in the stiff competition of the global animation market.

Therefore, in order to better promote the coordinated development of China's animation talent training and meet the needs of the animation industry, it is necessary to have the joint efforts of the government, colleges and universities, enterprises, and training institutions.

1.1.2 The Role of Government in Promoting Animation

In 2006, the government included the animation industry as an agenda in the national economic transformation and industrial restructuring plan, thus realizing the huge potentiality of animation as a global economic asset and soft power (X. Chen et al., 2010). From the industrial policy perspective, the government hopes to shift the outsourcing practice of foundry operations in the Chinese animation industry. The agenda aims to encourage local animation companies to venture into the whole spectrum of animation works in both the creation and production of animation design (H. Lee, 2010). Several creative animation parks have been

established nationwide to promote the significance of the animation industry, particularly in large cities. These include HuaChuang Animation Industrial Park in Guangzhou, LuoYang Animation Industrial Park in Luo Yang, and Hua Xia Animation Industrial Park in Shenzhen. The government initiatives have paid off. Based on the State Administration of Radio, Film, and Television (SARFT) report, there were around 30 regional animation production centers and 5,400 animation companies and studios in China by 2007 (Xiao, 2011). Adopting an approach like other Western developed countries, the government aims to posit Chinese animation as a global force in the 'creative industry', an industry that celebrates the originality and creativity of content-making as a way to promote the global identity of Chinese culture (S. Chen, 2017; H. Lee, 2010; Q. F. Liu, 2007; Mitkus & Nedzinskaitė-Mitkė, 2018).

Since its inception in 2013, the Belt and Road Initiative has been focusing on policy communication, facility connectivity, trade facilitation, financial mobilization, and people-to-people exchanges (J. Zhao, 2021). Among them, people-to-people communication refers to the strengthening of international exchanges and cooperation in culture and media. Especially in the context of globalization, animation has been encouraged as a medium to promote culture and education and national initiatives. This has increased the test for the animation industry and education, but it has an important supporting role for the Chinese and foreign animation industry and education in mutual exchanges and promotion (Z. Liu, 2021). For example, in January 2015, Xi'an Jiaotong University launched the University Alliance of the Silk Road (UASR) in order to create a platform for cooperation in higher education and to promote regional openness and synergy (Yue et al., 2022). UASR explores a new mechanism for cultivating talents across borders and cross-border mobility and fosters high-quality talents with an international outlook. UASR actively promotes comprehensive exchanges and cooperation in the fields of education, science and technology, culture, and other areas among universities of the "Belt and Road" partners and regions and serves the economic and social development of the "Belt and Road" partners and regions.

1.1.3 Animation and Animation-Related Majors

The setting of the animation profession and animation-related majors has undergone significant changes and expansion globally. In particular, the animation industry, as part of the creative industry economy, has been driven by capital, which has led to the rapid development of the animation industry, the continuous advancement of technology, and the growing standard of demand for animation talents in the industry (Snowball et al., 2022).

The animation profession has been more widely recognized and valued globally, especially in the case of the huge economic benefits behind it (Snowball et al., 2022). More and more colleges and educational institutions have begun to set up animation majors, aiming to train professionals with skills in animation creation, production, and post-production special effects (M. Smith, 2022).

These specialties not only cover traditional two-dimensional animation and three-dimensional animation techniques but also involve the application of cutting-edge technologies such as virtual reality and augmented reality (Assad, 2021).

The settings of animation-related majors have also become richer and more diverse. In addition to the animation majors themselves, many colleges and universities also offer animation-related choreography/directing majors, fine arts majors, and digital media technology majors. These majors provide students with a wider range of choices so that they can choose a suitable professional direction according to their interests and career plans.

With the advancement of globalization and the increase of transnational cooperation, the setting of animation majors and animation-related majors also shows the trend of internationalization. For many colleges and universities, strengthening cooperation and communication with the international animation industry, introducing international advanced animation education concepts and teaching resources, and improving the internationalization level of animation education will be the development direction of animation majors in the future.

1.1.4 Animation Education in Asia

Animation education in Asian countries is experiencing vigorous development. Different countries have formed their own distinctive animation education systems according to their own cultural characteristics and industrial development needs.

Japan's animation education enjoys a great reputation in the world (Pellitteri & Wong, 2021). The developed animation industry in Japan provides rich resources and experience for animation education. Japanese animation education not only focuses on the cultivation of technology but also emphasizes the understanding and application of creative elements such as storytelling and characterization. At the same time, Japan also focuses on the close integration of animation education and industry, providing students with a large number of practical opportunities and employment resources.

In South Korea, India, Malaysia, and other Asian countries, animation education also has its own characteristics. South Korea focuses on the innovation and internationalization of animation education and strives to cultivate animation talents with an international vision (Saputra et al., 2021). India combines its own cultural characteristics, combines animation education with local folk stories, myths, and legends, and creates animation works with a strong Indian style (Amir et al., 2011). Malaysia's animation education pays great attention to practice and exercises students' production ability and professionalism (Amir et al., 2011).

In general, animation education in Asian countries is gradually developing in combination with the actual situation of their own countries, providing a solid foundation for cultivating excellent animation talents (Saputra et al., 2021). At the same time, there are cultural similarities between countries, and their animation education exchanges have also promoted the prosperity and development of the Asian animation industry. However, people also need to see Asian animation education in the face of opportunities. At the same time, animation education in the countries is also facing challenges, such as how to better with international standards, how to cultivate more innovative and creative animation talent, and so on. These issues need the joint efforts of animation education circles in different countries to explore and practice.

1.1.5 Animation Education in Mainland China

With the rising growth of the animation industry in China, education plays a vital role in supplying the industry with competitive design talent. In 2011, Xiao Yongliang was commissioned by the National Animation Industry Promotion Office to study the state of animation education in China (Xiao, 2011). The study lists two types of animation education in China: animation majors and animation-related programs. It shows that 447 higher educational institutions in China provide animation majors, whereas around 1230 institutions offer animation-related programs (Xiao, 2011). A similar issue was emphasized by Zhao Shi highlighting the increasing number of colleges and universities that offer animation programs in China (S. Zhao, 2006). Dong Haibin (2018) points out that the most critical issue in Chinese animation education is cultivating talent for the industry. The Chinese animation companies' expectations for talent are no longer a single demand. The time when animators could complete animation projects by becoming proficient in software use has quietly ended. Employers prefer to hire more intelligent, thoughtful, creative, and problem-solving interdisciplinary individuals. Using the "7-2-1" training style, which teaches 70% of students in application-oriented skills, 20% of interdisciplinary skills, and 10% of top academic skills, Zhang Aihua and Meng Kaiyuan (2016) propose classifying student training. The training of animation students at colleges and universities should be aimed toward the direction of application-oriented abilities, with academic talents comprising just a small fraction.

While the above studies by Xiao and Li point to the emerging interest in animation education in China, they rely heavily on the data and information from industrial-driven reports provided by SARFT and the Ministry of Industry and Commerce (CMIC). Besides, these studies were conducted almost a decade ago. With significant industrial and educational progress in China over the past ten years, a new perspective is needed to understand the current status of Chinese animation education. In doing so, a reference from China's Ministry of Education is necessary to get comprehensive information about the animation programs offered in higher education institutions in mainland China.

1.2 Problem Statement

The lack of animation education hinders local graduates from meeting industrial expectations for acquiring competitive animation skills. This is evidenced by the Chinese government's annual report on graduate employment, which reveals a high unemployment rate among animation graduates. As a result, most animation students tend to choose other majors like graphic and packaging design after graduation. Some would also even give up on their careers in animation. The contradictory trends reflect a critical problem in recent animation education in China.

From an educational perspective, the problem highlights the issue of teaching quality in animation education in China. In this respect, this thesis outlines three main research issues which are as follows.

1.2.1 The Weaknesses in Animation Education in China

The consequences of the rapid expansion of China's animation profession are becoming more and more apparent in the context of globalization. Up to this day, few studies are focusing on weaknesses in animation education in Chinese universities based on different city levels and regions. The recent literature review from 2000 to 2019 points out that the teaching system of animation education research in China is still lagging far behind its global counterparts in terms of quantity and quality. For the operational purpose, to achieve a quick, reasonable student-faculty ratio for fulfilling requirements for a new major in animation education, many universities and colleges in China have hired teachers from other majors instead of animation. The teachers mostly have a professional background in art and design without specific qualifications relevant to the animation program. Over the recent years, authorities have not yet launched large-scale teacher training activities on animation education during the increasing trend of animation majors from 2000 to 2007. This study is framed in such a way that can focus on teaching animation education research in China.

1.2.2 Research on Animation Thinking Modes in Animation Education

Research on animation education in China has tended to focus more on the study of a single specialized course content and less on a full set of animation education thought patterns. Animation education in countries all over the world has also flourished under the impetus of globalization, forming an education system with its own characteristics. On the contrary, in China, the animation majors in most colleges and universities are not organized in a systematic and coherent way because the four-year course cycle for an animation student is too long; it is easy to forget what one has learned before. After completing the four-year undergraduate course, the students are still unable to fully understand animation production. There is a lack of research on the complete set of Chinese animation education thinking modes. Therefore, students can encounter multiple

issues relating to problem-solving tasks. In this case, it is necessary to train students to have a complete set of thinking modes to guide them to complete animation creation.

1.2.3 Less Regarding the Application of Design Thinking to Animation Education in China

The application of design thinking to animation education is still a fresh direction. Under the impetus of globalization, the animation industry, as an essential part of the cultural and creative industries, has been receiving more and more attention, and the industry's ability to innovate for animation talents has also risen. In the context of the Chinese educational environment, it is quite rare to refer to an application of design thinking in animation teaching as there is a paucity of systematic study on that. Design thinking emphasizes that design is a kind of “purposeful creative behavior” (Chang et al., 2018). It highlights how to guide us through a discovery of the relationship between knowledge and practical problems while constructing them, thus creating new knowledge and power to solve more complex issues. Therefore, an attempt is made to use design thinking to guide comprehensive animation creation to better identify and solve complex problems in the animation design process. For that purpose, the present study will focus on the possibility of integrating design thinking and animation education to develop a coherent animation teaching system that can assist teachers in cultivating creative thinking and ability among students.

1.3 Research Questions

According to the background introduction in Chinese animation education and the three issues summarized above, the specific research areas of concern in this research are determined. For example, the setting of animation and animation-related majors in the professional system of colleges and universities in mainland China, the problems detected in animation education, and the research directions and solution scope set for this study. The above research issues are specified into more precise research questions. Therefore, this study included three main research questions which are as follows:

1. Research question 1 (RQ1): What are critical issues in the current animation education context in mainland China?
2. Research question 2 (RQ2): What are the current educational approaches in Chinese animation education?
3. Research question 3 (RQ3): How to adopt an integration between design thinking and creative methods as an animation teaching system in Chinese animation education?

1.4 Research Objectives

This study's primary purpose is to create an association among design thinking, creative methods, and animation education. Following the research questions above, this thesis proposes the following research objectives:

1. Research objective 1 (RO1): To understand issues on animation education status in mainland China based on different regions and city levels.
2. Research objective 2 (RO2): To justify the current educational approach in Chinese animation education.
3. Research objective 3 (RO3): To propose an integration between design thinking and creative methods as a teaching system in Chinese animation education.

1.5 Research Scope and Limitations

The research subjects in this study focus on undergraduate animation education in mainland China and do not include research on vocational higher education institutions. Since the preferred case studies were located in different universities that are part of different regions, this scope was extended from animation majors to animation-related majors when determining the professional background of the experimental participants.

In addition, the scope of animation education is relatively broad. This study divides the content of animation education into the modules covered in the animation design process and determines the research scope. Here, the study only considers the pre-production of the animation production workflow. Other parts of the workflow, such as production and post-production, are not considered.

Design thinking, creative methods, and animation education are combined in this study. There are five creative methods used in the study namely, 5W1H, Causal Layered Analysis, Brainstorming, Mind Mapping, and Synectic. Based on the experiment that will be conducted in this study, the result will be assessed by using the consensual assessment technique.

1.6 The Significance of the Study

This study is a multidisciplinary research combining design issues, animation research, and education, aiming to provide an innovative research direction for the development of creative teaching methods in animation and to provide a preliminary study on the construction and practice of animation design thinking. This research is also expected to pave the way for exploring more possibilities,

especially in the issue of teaching animation and the creative industries more broadly.

The animation design thinking framework constructed in this study is an innovative approach to teaching animation-related disciplines. On the one hand, the theory of animation design thinking is combed and innovated. On the other hand, the animation design thinking framework is visualized by identifying clear operational steps and ways to use creative methods from different fields in animation design. The present research introduces a scientific argument for the role of the animation design thinking framework as a guiding strategy for creative behavior. Its argumentation process can be used as a reference basis in similar studies, drawing on the strengths of this study and avoiding the problems arising from its limitations. The experiment results can also serve as important reference material for whether or not it is meaningful to conduct similar experiments.

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