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**EXPLORING CHINESE UNIVERSITY STUDENTS' ADOPTION OF 360 PANORAMIC
ANIMATIONS: USABILITY, IMMERSION, AND BEHAVIORAL INTENTIONS**



**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
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**Exploring Chinese University Students' Adoption of 360 Panoramic Animations:
Usability, Immersion, and Behavioral Intentions**



**BY
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Abstract

This study investigates how 360-degree panoramic animations influence emotional engagement and behavioral intention among Chinese university students. While prior research on immersive media focused largely on technological or usability aspects, limited attention has been paid to the emotional and psychological mechanisms underlying students' interaction with panoramic animations. To address this gap, the study integrates the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) with sensory and emotional variables such as aesthetic design, user control, perceived enjoyment, immersion, hedonic motivation, and positive emotion. A mixed-methods approach was employed, combining quantitative data from 787 art students across three structured surveys with qualitative insights gathered from open-ended questions. Structural Equation Modeling was used to test four hypotheses, while thematic analysis of participants' responses enriched the interpretation of immersion and emotional engagement. Results demonstrate that aesthetic design and user control enhance usability, which in turn leads to greater immersion. Immersion further drives hedonic and positive emotions, which significantly predict students' behavioral intentions to engage with animations. These findings contribute to the refinement of TAM and UTAUT by incorporating emotional dimensions and provide implications for the design of immersive educational tools. The study offers actionable guidelines for animators and educators seeking to enhance student engagement and learning outcomes through emotionally resonant, interactive media.

Keywords: 360 Panoramic Animation, TAM, UTAUT, Usability, Immersion, Behavioral Intentions

ABSTRAK

Kajian ini menyelidik bagaimana animasi panorama 360 darjah mempengaruhi penglibatan emosi dan niat tingkah laku dalam kalangan pelajar universiti di China. Walaupun penyelidikan terdahulu mengenai media imersif banyak menumpukan kepada aspek teknologi dan kebolegunaan, mekanisme emosi dan psikologi yang mendasari interaksi pelajar dengan animasi panorama masih kurang diterokai. Bagi mengisi jurang ini, kajian ini menggabungkan Model Penerimaan Teknologi (TAM) dan Teori Penyatuan Penerimaan dan Penggunaan Teknologi (UTAUT) dengan pembolehubah deria dan emosi seperti reka bentuk estetik, kawalan pengguna, keseronokan yang dirasakan, kebolegunaan, imersi, motivasi hedonik, dan emosi positif. Pendekatan kaedah campuran digunakan, menggabungkan data kuantitatif daripada 787 pelajar seni melalui tiga tinjauan berstruktur dengan maklum balas kualitatif yang diperoleh daripada soalan terbuka. Pemodelan Persamaan Struktur digunakan untuk menguji empat hipotesis utama, manakala analisis tematik terhadap respons peserta memperkayakan interpretasi mengenai imersi dan penglibatan emosi. Hasil kajian menunjukkan bahawa reka bentuk estetik dan kawalan pengguna meningkatkan kebolegunaan, yang seterusnya membawa kepada imersi yang lebih mendalam. Imersi ini mendorong motivasi hedonik dan emosi positif, yang secara signifikan meramalkan niat tingkah laku pelajar untuk terlibat dengan animasi. Penemuan ini menyumbang kepada penambahbaikan TAM dan UTAUT dengan menggabungkan dimensi emosi dan memberikan implikasi praktikal untuk reka bentuk alat pendidikan imersif. Kajian ini menawarkan garis panduan yang boleh dilaksanakan untuk animator dan pendidik yang ingin meningkatkan penglibatan pelajar dan hasil pembelajaran melalui media interaktif yang beresonansi emosi.

KATA KUNCI: Animasi Panorama 360, TAM, UTAUT, Kebolegunaan, Penglibatan, Niat Tingkah Laku

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CHAPTER ONE: INTRODUCTION

This chapter presents the background and scope of the study. This section highlights several specific concepts and theories surrounding the study, which include the research context, motivation for the study, current research, problem statement, research gaps, research questions, research objectives, scope of the study and research implications, research hypotheses and theoretical frameworks on the topic are also included.

1.0 Background of the Study

Compared to traditional numerical interfaces, animated visuals have been shown to elicit more profound emotional responses and foster stronger intentions towards sustainable behaviors. This suggests a unique potential of animation to engage audiences on a deeper emotional level, thereby influencing their behavioral inclinations in a more meaningful way (Fang & Sun, 2016; Zhang & Song, 2022). A scholar describes This role for emotional involvement by pointing out how animators interact with their own emotions throughout the creation process and the emotions of the audience seeing their work during the screening (Çakıroğlu, Aydın, Özkan, Turan, & Cihan, 2021). Recent studies have discovered that immersive videos enhance emotional engagement and influence people's behavioral attitudes, underscoring the potential of This artistic medium to impact attitudes and behaviors across various contexts (Pressgrove & Bowman, 2021). Immersive experiences are regarded as one of the foremost methodologies for catering to user perceptions and hedonistic inclinations, given that the hedonic dimensions significantly influence experiential perceptions and amplify immersion. Within the context of panoramic

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APPENDIX 1

Questionnaire

Narrative panoramic Animation Questionnaires 叙事

类全景动画调查问卷

为了更好地了解不同动画媒介对您情绪的影响，促进动画艺术的发展，提高人们创作动画艺术的能力和您观看动画的审美能力，请您填写您观看动画时的感受和情绪变化，以及您观看动画时对沉浸感的态度。请您在观看动画短片之后进行选择，<https://www.youtube.com/watch?v=WqCH4DNQBUA>（科学上网）或https://www.bilibili.com/video/BV1q5411576u/?spm_id_from=333.337.search-card.all.click&vd_source=76ec87816a3d0fd8d7def5dcc9213261（小破站）。本问卷仅作为研究者的数据调查，我们将保护您提供的隐私。

In order to better understand the impact of different animation mediums on your emotions, to promote the art of animation, to improve people's ability to create animation art and your aesthetic ability to watch it, you are invited to fill in your feelings and emotional changes when watching animation, as well as your attitude towards immersion when watching animation. Please make your selection after watching the animated clip at <https://www.youtube.com/watch?v=WqCH4DNQBUA> or https://www.bilibili.com/video/BV1q5411576u/?spm_id_from=333.337.search-card.all.click&vd_source=76ec87816a3d0fd8d7def5dcc9213261. This questionnaire is intended as a data survey for the researcher only and will be read carefully and in a way that protects the privacy you provide.

*1. 您的姓名: Name:

*2. 您的专业 Major:

艺术类 动画或多媒体

☐ 动画 Animation:

☐ 多媒体 Multimedia:

☐ 游戏设计 Game Design:

☐ 游戏美术

*3. 您的性别: Gender:

☐ 男 Men:

☐ 女 Women:

*4. 请输入您的年龄: Age:

☐ 18-20

☐ 20-22

*5. 您的联系方式 Contact Way:

邮箱

*6. 美学审美设计

1这个360全景动画是配色协调的

Aesthetic Design

1 this 360 panoramic animation is colourful

1非常反对
strongly
disagree

2反对
disagree

3一般

4赞同agree

5非常赞同
strongly

外观

功能

Universiti Utara Malaysia

*7. 美学审美设计

2这个360全景动画很有创意

Aesthetic Design

2 this 360 panoramic animation is creative

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*8. 美学审美设计

3.这个360度全景动画展示了良好的动画内容

Aesthetic Design

3 this 360 degree panoramic animation shows good pictures of the animation

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*9. 美学审美设计

4.这个360度全景动画令人舒适愉快

Aesthetic Design

4this 360 panoramic animation is pleasant

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐

功能	☐	☐	☐	☐	☐
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*10. 用户控制

1这个360度的全景动画，在我观看时给出了明确的信息，告诉我如何解决问题如何观看。

User Control

1this 360 degree panoramic animation give messages that clearly tell me how to fix issues when i am watching

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*11. 用户控制

2当我在看这个360全景动画时犯了一个错误误操作，我很容易和迅速地恢复。

User Control

2whenever i make a mistake watching this 360 panoramic animation, i recover easily and quickly

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*12. 用户控制

3.这个360全景动画所提供的信息（如用鼠标平移和查看周围，用手指平移和查看周围，视觉

引导) 是清晰的。

User Control

3the information(such as use the mouse to pan and look around,use a finger to pan and look around,visual guidance)provided with this 360 panoramic animation is clear

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*13. 用户控制

4.我可以自由选择想看的内容

User Control

4I can choose freely what I want to see

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*14. 感受享受性/乐趣

1我相信我会觉得观看这个360度全景动画很愉快

Perceived Enjoyment

1I believe i would find watching 360 degree panoramic animation enjoyable

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐

功能

*15. 感受享受性/乐趣

2我相信我看360度全景动画会很开心

Perceived Enjoyment

2I believe i would have fun watching 360 degree panoramic animation

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*16. 感受享受性/乐趣

3使用设备观看360度全景动画会很刺激/兴奋

Perceived Enjoyment

3using devices to watch 360 degree panoramic animation would be exciting

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*17. 感受享受性/乐趣

4使用设备观看360度全景动画会很愉快

Perceived Enjoyment

4using devices to watch 360 degree panoramic animation would be enjoyable

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*18. 感知易用性

1我相信使用设备观看360度全景动画对我来说是很容易的。

Perceived ease of use

1I believe using devices to watch 360 degree panoramic animation would be easy for me

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*19. 感知易用性

2我相信让360度全景动画做我想看的内容很容易。

Perceived ease of use

2I believe it would be easy to get 360 degree panoramic animation to do what i want it to watch

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*20. 感知易用性

3我觉得观看360度全景动画很清楚和明白。

Perceived ease of use

3I believe watch 360 degree panoramic animation would be clear and understandable

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*21. 感知易用性

4我认为观看360度全景动画可以灵活地与之互动

Perceived ease of use

4I would find 360 degree panoramic animation flexible to interact with

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*22. 沉浸感

1这个360全景动画创造了一个新的世界，在这个360全景动画的结尾感觉回到了现实。

Immersion

1This 360 panoramic Animation created a new world that suddenly disappeared at the end of this 360 panoramic animation.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
	☐	☐	☐	☐	☐

外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*23. 沉浸感

2在观看时，我对现实中周围的环境毫无察觉。

Immersion

2At times, I was unaware of my surroundings.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*24. 沉浸感

在观看这部360全景动画时，我的身体在现实房间里，但我的思想却在动画创造的世界里。

Immersion

3During the watch this 360 panoramic animation, my body was in the room, but my mind was in the world created by the animation.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*25. 沉浸感

4这个360全景动画让我暂时忘记了外面现实世界。

Immersion

4 This 360 panoramic Animation made me forget the realities of the world outside.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*26. 沉浸感

5 在这个360全景动画中，之前发生的事情或之后会发生什么都不再重要。Immersion

5 During this 360 panoramic Animation, what happened before or what would happen afterwards did not matter anymore.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*27. 沉浸感

6 这个360全景动画让我暂时忘记了我周围的环境。

Immersion

6 This 360 panoramic Animation made me forget about my immediate surroundings.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*28. 享乐动机

1观看全景动画很有趣

Hedonic Motivation

1Watching this 360 panoramic animation is fun.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*29. 享乐动机

2观看全景动画令人愉悦

Hedonic Motivation

2Watching this 360 panoramic animation is enjoyable.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*30. 享乐动机

3观看全景动画是一种享受

Hedonic Motivation

3Watching this 360 panoramic animation is pleasure.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*31. 享乐动机

4观看全景动画让人身心放松

Hedonic Motivation

4Watching this 360 panoramic animation is relaxing.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*32. 积极的情绪

1在观看这个360全景动画时，我感到较兴奋。

Positive emotion

1During watch this 360 panoramic animation, I felt enthusiastic.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*33. 积极的情绪

2在观看这个360全景动画时，我感到很充实。

Positive emotion

2During watch this 360 panoramic animation, I felt fulfilled.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*34. 积极的情绪

3在观看这个360全景动画时，我感到较满意。

Positive emotion

3During watch this 360 panoramic animation, I felt satisfied.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*35. 积极的情绪

4在观看这个360全景动画时，我感到挺受鼓舞。

Positive emotion

4During watch this 360 panoramic animation, I felt encouraged.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐

功能

☐☐☐☐☐

*36. 积极的情绪

5在观看这个360全景动画时，我感到希望。

Positive emotion

5During watch this 360 panoramic animation, I felt hopeful.

1非常反对
strongly
disagree

2反对
disagree

3一般

4赞同agree

5非常赞同
strongly

外观

☐☐☐☐☐

功能

☐☐☐☐☐

*37. 积极的情绪

6在观看这个360全景动画时，我感到乐观。

Positive emotion

6During watch this 360 panoramic animation, I felt optimistic.

1非常反对
strongly
disagree

2反对
disagree

3一般

4赞同agree

5非常赞同
strongly

外观

☐☐☐☐☐

功能

☐☐☐☐☐

*38. 行为意图/意向

1我将推荐观看这个动画艺术体验。

Behavioural intentions

1I will recommend watching this Animation artistic experience.

1I will recommend watching this Animation artistic experience.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*39. 行为意图/意向

2我会想再去和体验这个动画艺术。

Behavioural intentions

2I will return to see the Animation aesthetic experience.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*40. 行为意图/意向

3我期待着再去观看这样的全景动画。

Behavioural intentions

3I expect to watch this kind of 360 panoramic animation.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

*41. 行为意图/意向

4我打算今后继续观看这样的全景动画。

Behavioural intentions

4I intend to continue watch this kind of 360 panoramic animation next few years.

	1非常反对 strongly disagree	2反对 disagree	3一般	4赞同agree	5非常赞同 strongly
外观	☐	☐	☐	☐	☐
功能	☐	☐	☐	☐	☐

APPENDIX 2

Published Article

Fangling, P., Suki, N. M., & Muhaiyuddin, N. D. M. (2023). The impact of perception and immersion on positive emotion towards 360 panoramic animation among university students-a structural equation modeling. *Arts Educa*, 36.

Fangling, P., Suki, N. M., & Muhaiyuddin, N. D. M. (2023, October). Examination the Impact of Interactive Animation on College Students' Behavior: Insights from TAM and SEM. In *2023 IEEE 13th International Conference on System Engineering and Technology (ICSET)* (pp. 171-176). IEEE.

Pei, F., Suki, N. M., Suki, N. M., & Muhaiyuddin, N. D. M. (2024). Student Immersive Experiences Engaging With Panoramic Animations in the Post-Pandemic Era: Examining Hedonic Motivation, Positive Emotions, and Behavioral Intentions. In *Exploring Technology-Infused Education in the Post-Pandemic Era* (pp. 208-238). IGI Global.