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Aerial Storytelling for Local Identity: Redesigning Drone Photography Course through a Conghua Cultural Landmark Project

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Abstract: With the growing prevalence of drone technology in photography education, innovative teaching methodologies are increasingly crucial for effectively enhancing students' skills and competencies. This paper presents the design and implementation of a Project-Based Learning (PBL) drone aerial photography course centered on local cultural heritage, using a student photography project focused on cultural landmarks in Conghua, Guangzhou, as a case study. The paper particularly examines how the course, through the PBL model, effectively integrates technical drone operation and aerial photography skills with local cultural understanding, thereby promoting the holistic development of students' comprehensive abilities. Findings demonstrate that the course significantly enhanced students' learning engagement, improved their technical proficiency in drone operation and aerial photography, and deepened their awareness of and sense of identity with the local culture of Conghua. This study offers significant practical and theoretical insights for innovating photography education models and fostering a deeper integration of technology and cultural education.

Keywords: Drone Photography Education; Project-Based Learning; Local Cultural Heritage; Local Identity; Curriculum Design; Cultural Awareness

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1.Introduction

The rapid advancement and increasing accessibility of drone technology have fundamentally reshaped various industries, with a particularly transformative impact on photography and visual media production. Drones offer unprecedented perspectives, enabling photographers and videographers to capture aerial views and dynamic shots that were previously expensive, complex, or impossible to achieve. As drones become essential tools in fields ranging from journalism and real estate to filmmaking and artistic expression, photography and visual arts education faces a pressing need to adapt its curriculum to incorporate these new technologies effectively. For students pursuing degrees in Photography, proficiency in drone operation and aerial cinematography is rapidly becoming a critical skill for professional success. Beyond technical proficiency, drones also offer a unique capability for documenting the world from novel angles, holding significant potential for creatively exploring and preserving cultural heritage sites.

Despite the growing importance of drones, many traditional photography and visual arts curricula may not adequately equip

students with the practical skills required for competent drone piloting and safe, effective aerial cinematography. Furthermore, some existing courses can lack engaging, real-world applications that motivate students and connect their technical learning to broader contexts. A significant challenge in developing such curricula lies in effectively integrating this specialized technical training – involving flight regulations, safety protocols, and aerial composition – with broader educational goals, such as fostering cultural awareness, critical thinking, and narrative storytelling. This gap can leave graduates less prepared for the demands of the modern visual media landscape and may limit the potential for using drone technology as a tool for meaningful cultural documentation.

Addressing these challenges requires innovative pedagogical approaches. Project-Based Learning (PBL) offers a compelling model, providing an active, student-centered framework that encourages hands-on application, problem-solving, and critical thinking within a real-world context. By centering a drone aerial photography course around a specific, meaningful project, such as documenting local cultural heritage, students can gain practical technical skills while simultaneously developing a deeper understanding and appreciation of their cultural environment. The city of Guangzhou, particularly areas like Conghua with rich yet sometimes overlooked cultural landmarks, provides an ideal setting for such a project, allowing students to contribute to the preservation and promotion of local identity through their visual work. This study contributes to the discourse on innovative pedagogical approaches in higher education, specifically within visual arts and media programs, by presenting a designed and evaluated PBL model for drone aerial photography education that successfully integrates technical skill development with cultural understanding and real-world application.

The primary objective of this study is to design, implement, and evaluate a Project-Based Learning-based drone aerial photography course specifically tailored for documenting cultural landmarks in Conghua, Guangzhou. Building upon this primary objective, the study seeks to answer the following secondary objectives and research questions: How can a Project-Based Learning drone aerial photography course, focused on Conghua cultural documentation, be designed and implemented to enhance undergraduate students' technical skills, cultural understanding, and overall learning experience?

This study focuses on undergraduate students enrolled in Photography majors at a university in Guangzhou. The scope is specifically limited to the design, implementation, and evaluation of a one-semester "Drone Aerial Photography" course structured around a Project-Based Learning model. The core practical component involves students undertaking shooting and creative projects centered on specific cultural landmarks within Conghua, with a particular focus on key sites such as the Wenfeng Pagoda.

Delimitations of this study include the specific institutional context and student cohort, which may limit the direct generalizability of findings to all photography or film programs. The evaluation period is limited to the duration of one academic semester, providing insights into immediate learning outcomes and perceptions rather than long-term impacts on career or cultural engagement. Furthermore, the study focuses on the pedagogical approach and student outcomes related to technical skills and cultural awareness within the specified project, and does not include a comparative analysis with other teaching methodologies.

2.Theoretical Framework and Literature Review

2.1 Theoretical Framework

This study is underpinned by several theoretical perspectives that inform the design and understanding of integrating drone photography education with local cultural heritage storytelling within a Project-Based Learning context.

2.1.1 Storytelling Theory

Storytelling is a fundamental human activity crucial for cultural transmission and identity formation (Bruner, 1991; Fisher, 1987). It involves structuring experiences and information into narratives that resonate with audiences, embedding values, beliefs, and historical understanding (Hardy, 2017; Squire, 2008). Effective storytelling, particularly visual storytelling, relies on elements like plot, character (or subject), setting, and narrative perspective (McKee, 1997; Phillips, n.d.; Ryan, 2004). In the context of cultural heritage, storytelling provides a powerful framework for interpreting and communicating the significance of traditions, landmarks, and histories, fostering emotional connections and ensuring continuity across generations (Kirshenblatt-Gimblett, 1998; Roque, 2022; Smith, 2006). Applying storytelling theory helps frame how drone-

captured visuals can be organized and presented to convey meaningful narratives about local culture.

2.1.2 Cultural Geography Theory

Cultural geography examines the complex relationship between human cultures and the physical environment, focusing on how cultural practices shape and are shaped by geographical contexts (Sauer, 1925). Key concepts include the study of cultural landscapes, which are physical spaces modified by human activity that reflect a community's values, history, and identity (Cosgrove, 1984). Understanding cultural landscapes, such as the historic villages and landmarks of Conghua District, provides crucial context for interpreting local identity (Duncan & Duncan, 1992). Cultural geography also considers the spatial dimensions of cultural practices and the role of place in reinforcing identity (Relph, 1976). Utilizing a cultural geography lens helps analyze how aerial perspectives gained through drone photography can illuminate the spatial arrangement and significance of cultural heritage sites, enhancing understanding of the local cultural landscape.

2.1.3 Relevant Educational Theories

This study draws upon educational theories that emphasize active, situated, and experiential learning. Constructivism posits that learners actively construct knowledge and meaning based on their experiences and interactions with the world (Piaget, 1972). Experiential Learning Theory (ELT) emphasizes learning through a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Situated Learning Theory highlights that learning is most effective when embedded within authentic contexts and social interactions. These theories collectively support the use of Project-Based Learning and hands-on activities like drone operation in real-world cultural settings, promoting deeper engagement, skill development, and meaningful knowledge construction regarding local heritage.

2.2 Literature Review

2.2.1 Project-Based Learning (PBL) in Higher Education

Project-Based Learning (PBL) is recognized as a student-centered pedagogy where learners engage in extended projects that require solving complex, real-world problems (Almulla, 2020). Key characteristics include a driving question, authentic tasks, collaboration, inquiry, and creation of a public product. Research indicates that PBL in higher education can enhance critical thinking, problem-solving, communication, and collaboration skills, while increasing student motivation and depth of understanding. Challenges include design complexity, assessment difficulties, and resource requirements. PBL has been applied in various disciplines, including arts and design, where studio-based work often shares similarities with PBL principles by focusing on creative problem-solving and iterative development towards a final exhibition or presentation.

2.2.2 Drone Technology in Photography and Education

Drone technology has rapidly transformed photography, enabling unique aerial perspectives for various applications, including landscape, architecture, journalism, and cultural documentation (Ng & Cheng, 2019). Technical aspects relevant to photography involve camera systems, flight control, safety features, and image processing . The integration of drone technology into educational curricula, particularly in photography and media studies, is an emerging area. Studies explore pedagogical approaches for teaching drone operation, aerial composition, and the legal and ethical considerations of drone usage. Ethical concerns, such as privacy, safety, and regulatory compliance, are crucial considerations in educational and public contexts. Existing research suggests the potential of drones to enhance technical skills and provide innovative learning experiences.

2.2.3 Photography, Cultural Heritage, and Local Identity

Photography plays a significant role in the documentation, preservation, and interpretation of cultural heritage . It provides visual records essential for conservation, research, and archiving . Visual storytelling through photography contributes to cultural dissemination by making heritage accessible and engaging for wider audiences . Local cultural landmarks serve as tangible symbols of community history and identity . Photography can strengthen the connection between residents and their heritage, fostering pride and encouraging participation in preservation efforts . Research highlights the power of visual media to convey the significance of places and contribute to the construction and reinforcement of local identity .

2.3 Synthesis and Research Gap

The literature reviewed establishes the value of Project-Based Learning as an engaging pedagogical approach in higher

education, highlights the transformative capabilities of drone technology in photography and its potential in education, and underscores the critical role of photography in documenting and disseminating cultural heritage and shaping local identity. While these areas are individually explored in academic literature, there is a notable lack of comprehensive research specifically investigating the integrated application of all these components.

Existing studies may touch upon elements such as using technology in PBL, or employing drones for documentation, or photography projects related to cultural heritage. However, the specific pedagogical approach of utilizing a structured Project-Based Learning framework to teach drone photography skills with the explicit goal of documenting and interpreting local cultural heritage for storytelling and identity enhancement, particularly within a higher education curriculum in a specific regional context like Conghua District, remains significantly underexplored. The literature does not provide a tested framework or empirical evidence on the effectiveness of this combined approach in achieving the specific educational and cultural objectives outlined in this study.

Therefore, this study addresses this gap by developing and evaluating such an integrated PBL-based drone photography educational framework focused on local cultural heritage in Conghua District. It aims to provide empirical insights into the feasibility and impact of this novel approach on student learning, skill development, cultural awareness, and community engagement, contributing a unique perspective to the literature at the intersection of educational technology, cultural preservation, and visual communication.

3.Methodology

3.1 Research Design

This study adopts a mixed-methods research design, primarily employing qualitative approaches supported by quantitative data. The rationale for this design is to gain a comprehensive understanding of the phenomenon by exploring in-depth perspectives (qualitative) while also capturing broader patterns and self-reported outcomes (quantitative). An overarching participatory design principle was incorporated, involving relevant stakeholders in the development and refinement process of the educational intervention.

The qualitative components, including case study, interviews, and observation, were used to explore the nuanced processes of integrating drone technology and cultural storytelling in an educational context, understand participants' experiences and perceptions, and document the practical implementation. The quantitative components, primarily surveys, were used to measure self-reported changes in knowledge, skills, attitudes, and engagement levels among participants. Data from both strands were collected concurrently and integrated during the analysis phase to provide a more holistic interpretation of the findings.

3.2 Research Setting and Participants

The research was conducted in Conghua District, Guangzhou, Guangdong Province, a region selected for its rich cultural heritage and distinct local landmarks suitable for aerial documentation. The study's primary setting is a university offering programs relevant to the research focus. Participants were drawn from several key groups:

Students: Undergraduate students enrolled in Photography major who participated in a dedicated aerial photography course. These students were the direct participants in the educational intervention.

Educators: Faculty members involved in teaching the aerial photography course or related subjects.

Community Stakeholders: Local residents, cultural experts, or representatives from heritage sites in Conghua District involved through interviews or interactions related to the student projects.

Student participants were selected based on their enrollment in the specific course, representing a convenience sample within the context of the educational program. Educators and community stakeholders were selected using purposeful sampling based on their expertise and relevance to the study's objectives (Suri, 2011).

3.3 The Educational Intervention (Case Description)

The core of this study is a semester-long Project-Based Learning module embedded within the aerial photography course for Photography major students. This module serves as the primary case under investigation.

The project required students to work individually or in small groups over one academic semester to:

Select and research a specific local cultural landmark in Conghua District suitable for aerial photography documentation and storytelling (examples include Wen Feng Pagoda, Liuxi River, etc.).

Develop a creative plan for visual storytelling using drone photography, including concept, narrative arc, shooting list, and potentially storyboards.

Receive technical training in safe and ethical drone operation, relevant regulations, and aerial photography techniques.

Execute aerial shooting at the chosen landmark, adhering to legal and ethical guidelines.

Complete post-production (editing video/stills, adding narrative elements).

Publish the final visual story on a streaming platform (e.g., Bilibili, Tiktok, etc.).

This intervention was designed to integrate technical skill acquisition with cultural understanding, creative expression, and public dissemination, embodying the principles of PBL and the study's theoretical framework.

3.4 Data Collection Methods

3.4.1 Qualitative Data Collection

A range of qualitative and quantitative methods were employed to collect data throughout the study period (one academic semester). Qualitative data provided in-depth insights into participants' experiences, perceptions, and the processes involved.

Semi-structured Interviews: Conducted with selected students, educators, and community stakeholders. Interviews explored motivations for participation, learning experiences, challenges encountered, perceptions of drone photography's role in cultural heritage, impact on local identity, and views on community engagement. An interview protocol was developed to guide discussions while allowing for emergent themes. Interviews were audio-recorded and transcribed.

Observations: Direct observation was conducted during student workshops, fieldwork sessions at cultural landmarks, and potentially during final project presentations. Field notes documented student-drone interactions, collaboration patterns, challenges faced during shooting, engagement with the cultural site, and the nature of community interactions (Mann, 2003).

Document Analysis: Analysis included student project proposals, final video outputs, reflective journals (if available), course syllabi, and relevant local cultural documentation. This provided insights into the students' understanding, creative approaches, and the content created (Bowen, 2009).

3.4.2 Quantitative Data Collection

Quantitative data was collected primarily through surveys to gather systematic feedback on perceived outcomes and engagement.

Surveys: An online survey (Google Forms) was administered to participating students at the end of the semester. The survey included sections on demographics, prior experience with photography/drones, self-assessment of technical skills gained, perceived understanding of cultural heritage, attitudes towards local identity and preservation, engagement levels with the project and community, and overall satisfaction with the PBL approach. Questions utilized Likert scales, multiple choice, and limited open-ended responses (Mathiyazhagan & Nandan, 2010) .

3.5 Data Analysis Methods

3.5.1 Qualitative Data Analysis

Interview transcripts, observation notes, and document content were analyzed using thematic analysis (Clarke & Braun, 2017). The process involved: Familiarizing with the data. Generating initial codes. Searching for themes across codes. Reviewing themes. Defining and naming themes. Producing the report. Qualitative analysis software was used to assist in organizing and coding the data.

3.5.2 Quantitative Data Analysis

Survey data was analyzed using statistical software . Analysis included:

Descriptive Statistics: Frequencies, percentages, means, and standard deviations were calculated to summarize participant demographics and their responses to survey items (Cooksey & Cooksey, 2020).

Inferential Statistics: (Specify potential tests based on research questions/hypotheses. Examples might include: Paired t-tests or Wilcoxon signed-rank tests if pre- and post-intervention data is available, comparing means between groups using independent t-tests or ANOVA if relevant, correlation analysis to explore relationships between variables like engagement and

perceived learning outcomes, or basic regression if exploring predictors). The specific tests used will depend on the nature of the data and research questions.

3.5.3 Mixed Methods Integration

Integration of qualitative and quantitative findings occurred during the interpretation phase. Qualitative data was used to elaborate on, explain, and provide context for the quantitative results (Pluye, García Bengoechea, Granikov, Kaur, & Tang, 2018) . Triangulation was employed by comparing findings from different data sources (interviews, observations, surveys, documents) to enhance the credibility of the conclusions.

3.6 Methodological Rigor

Measures were taken to ensure the rigor of the research. For qualitative data, credibility was enhanced through prolonged engagement (semester duration), triangulation of data sources (interviews, observation, documents), and potentially member checking (if participants reviewed transcripts/findings). For quantitative data, reliability of the survey instrument was considered (e.g., through internal consistency measures like Cronbach's alpha if applicable), and validity was addressed by aligning survey items with research constructs.

4.Key Observations from the Conghua Project: Integrating Drone Photography, PBL, and Cultural Heritage Storytelling

This This section presents key observations and emergent themes derived from the analysis of the Conghua educational project, a semester-long Project-Based Learning (PBL) intervention integrating drone photography education with local cultural heritage documentation. These observations highlight the dynamics and potential impacts of this integrated approach on student learning, engagement, and the intersection of technology and cultural preservation.

Analysis of the Conghua case indicated that the project design effectively fostered a pedagogical environment requiring students to synthesize technical drone operation skills with creative visual storytelling and cultural understanding. Moving beyond mere technical acquisition, students were challenged to utilize aerial perspectives and videography techniques to interpret and convey the specific historical and cultural narratives associated with selected Conghua landmarks (Richter & Winter, 2014) . This integration was observed as crucial; technical skills became a means to an end—powerful cultural communication—rather than an isolated objective. This aligns with interdisciplinary learning objectives that seek to bridge technological proficiency with humanistic understanding .

Observations from the Conghua project suggested that direct, experiential engagement with local cultural heritage sites through the process of aerial documentation and storytelling had a significant potential to deepen students' cultural awareness and appreciation. The act of researching, visiting, and actively representing sites like Wen Feng Pagoda or the Liuxi River from novel aerial viewpoints appeared to enhance students' understanding of their local environment's historical and cultural layers. This hands-on interaction facilitated a stronger connection to local identity and heritage, consistent with principles of situated learning and theories of place attachment, where direct experience in a specific context enhances learning and emotional connection .

The Conghua project underscored the power of visual storytelling via drone photography as an effective mechanism for cultural interpretation and dissemination. By requiring students to develop and publish narratives for public streaming platforms, the project leveraged the unique visual capabilities of aerial photography—such as revealing the relationship between a landmark and its landscape (Cultural Geography), or capturing intricate details—to create engaging content . This approach not only served as a creative outlet but also functioned as a means to communicate the significance of Conghua's cultural assets to broader audiences, potentially fostering wider appreciation and understanding beyond the local community .

The implementation of the Project-Based Learning framework within the Conghua case demonstrated its suitability for promoting deep, engaged learning in a culturally focused, technology-integrated context. The problem-centered, student-driven nature of the project, coupled with the hands-on fieldwork and tangible output, appeared to highly motivate students and facilitate active knowledge construction regarding both drone technology and cultural heritage . This aligns with constructivist and experiential learning theories, highlighting the value of learning-by-doing in authentic, real-world settings like the cultural landscapes of Conghua . While specific community participation varied by project, the framework is conducive to

incorporating participatory elements, linking educational activities to community heritage initiatives .

The Conghua project contributed to creating contemporary visual documentation of local cultural landmarks through student aerial photography and videography. These outputs serve as valuable digital records of the sites at a particular moment in time. While the project's primary goal was educational, the resulting high-resolution imagery and visual narratives offer a potential resource that could support local heritage documentation and raise awareness about the importance of preservation among both creators and viewers . Documentation is a foundational step in heritage preservation, and the project demonstrated a scalable method for generating such resources .

The implementation of the Conghua project brought to light practical challenges inherent in integrating drone technology fieldwork with educational objectives in a real-world cultural setting. These included navigating the complexities of local airspace regulations and safety protocols applicable to flying near heritage sites or public areas, managing logistical aspects like equipment access and maintenance for students, and addressing ethical considerations, particularly concerning privacy and gaining appropriate permissions when filming in public spaces or areas with community members . These challenges highlight the need for thorough planning, training, and ethical guidelines in developing similar educational initiatives .

Building on these foundational observations, the Conghua project offers a compelling case study for examining the pedagogical affordances of drone technology when intentionally scaffolded within a PBL and cultural heritage framework. The synthesis of technical drone operation with creative visual storytelling and cultural understanding (Observation 1) moves beyond simple interdisciplinary connections, venturing into what could be termed transdisciplinary competence. Students were not merely learning about technology, about storytelling, and about cultural heritage in parallel; rather, they were challenged to iteratively negotiate the tensions and synergies between these domains. For instance, the limitations of drone battery life or specific airspace regulations directly influenced narrative choices and shot composition, forcing a pragmatic yet creative reconciliation of technical constraints with artistic and interpretive goals. This iterative negotiation aligns with models of complex problem-solving and adaptive expertise (Hatano & Inagaki, 1986), suggesting that such projects cultivate higher-order thinking skills crucial for navigating ill-defined, real-world challenges. Future research could quantitatively and qualitatively assess the development of these specific cognitive skills in similar learning environments.

The deepened cultural awareness and appreciation (Observation 2) engendered by direct, experiential engagement with local heritage sites merits further theoretical exploration. While situated learning and place attachment theories provide a robust explanatory framework, the specific role of aerial perspectives in shaping this connection warrants deeper investigation. Aerial viewpoints, as distinct from terrestrial observation, can uniquely reveal spatial relationships, historical layouts, and environmental contexts previously abstracted or invisible from ground level (Cosgrove, 1984; Lillesand, Kiefer, & Chipman, 2015). This "epistemological shift" afforded by the drone's eye may not only enhance understanding of a site's physical and historical layers but also foster a sense of critical spatial literacy—an ability to read, interpret, and critique the socio-spatial narratives embedded in a landscape. The project thus potentially empowers students to move beyond passive consumption of heritage narratives towards an active, critical engagement with how places come to hold meaning, and for whom.

Regarding the power of visual storytelling for cultural interpretation and dissemination (Observation 3), the Conghua project highlights the democratizing potential of accessible aerial imaging technologies. By enabling students to become creators and disseminators of cultural narratives, the project implicitly challenged traditional, often top-down, modes of heritage communication. However, this democratizing aspect also invites critical reflection on issues of representation, authenticity, and the potential for perpetuating or inadvertently creating new forms of "aerial Orientalism" or romanticized portrayals if not carefully guided (Said, 1978; Kaplan, 1994, on visual cultures). The pedagogical imperative, therefore, extends to cultivating an ethical visual literacy, encouraging students to critically consider whose stories are being told, from what perspective, for what audience, and with what potential impact. The use of public streaming platforms further amplifies these considerations, necessitating discussions on digital ownership, community consent beyond site access, and the long-term preservation and accessibility of these student-generated digital cultural assets.

Furthermore, while the Project-Based Learning framework (Observation 4) proved effective, the nuances of its implementation in a culturally sensitive and technologically complex domain deserve scrutiny. The "varied community participation"

noted is a critical point. Future iterations or similar projects should systematically explore models for more deeply embedded and reciprocal community engagement, moving beyond the community as a "site" or "subject" towards genuine partnership in knowledge co-creation (Strand et al., 2003). This could involve community members as co-designers of the project briefs, mentors, or evaluators of the narrative outputs. Such an approach would not only enrich the learning experience but also enhance the project's ethical grounding and local relevance, potentially fostering more sustainable outcomes for both students and the community. The challenges encountered (Observation 6)—navigating regulations, managing logistics, and addressing ethics—are not merely obstacles but are themselves potent learning opportunities if explicitly framed as such within the PBL structure, fostering resilience, problem-solving, and ethical reasoning in authentic contexts.

Finally, the creation of contemporary visual documentation (Observation 5) positions students as active contributors to the evolving archive of local cultural heritage. This contribution, however, necessitates a discussion on the nature of such an archive. Is it a static record, or a dynamic, contested space? Student outputs, imbued with their unique perspectives and skill levels, add a particular temporal and interpretive layer to the representation of these landmarks. Integrating these student-generated materials with existing official archives, or creating platforms for their curated public access, could be a valuable future direction, but one that requires careful consideration of metadata standards, preservation strategies, and intellectual property rights. This also opens avenues for longitudinal studies, tracking how these digital representations are used, perceived, and potentially influence public engagement with Conghua's cultural heritage over time, offering insights into the evolving relationship between technology, pedagogy, and cultural memory in the digital age.

5.Conclusion

5.1 Research Summary

This study explored the integration of drone photography education with local cultural heritage storytelling within a PBL framework, utilizing the Conghua project as a case study. The findings from this case suggest the significant potential of such an approach. Based on the analysis of the Conghua project, several key findings regarding its implementation and potential impact emerged. The project demonstrated the capacity to effectively integrate technical drone operation skills with creative visual storytelling and an understanding of specific cultural contexts, moving beyond purely technical training . The experiential nature of the project, involving hands-on fieldwork at Conghua's cultural landmarks, appeared to enhance students' cultural awareness, appreciation, and connection to local identity . Furthermore, the project highlighted visual storytelling via aerial perspectives as a promising method for interpreting and disseminating local culture to wider audiences through public platforms . The PBL framework proved to be a suitable pedagogical approach for facilitating deep learning, critical thinking, and engaged participation in this interdisciplinary context . The student outputs also contributed valuable contemporary visual documentation of Conghua's cultural heritage sites . Overall, the Conghua project indicated that drone photography can be effectively integrated into local cultural education programs, yielding benefits for both learning experiences and cultural engagement.

This study is subject to several limitations. Primarily, its focus on a single case study in Conghua District limits the generalizability of the findings to other geographical or cultural contexts, as the specific local dynamics and educational environment are unique to Conghua . The scope and diversity of participants for qualitative data collection were constrained, which may have limited the breadth of perspectives captured . While employing mixed methods, the study's reliance on qualitative data means statistical generalization about broader trends or causal relationships is limited compared to studies with more robust quantitative designs . Additionally, while comprehensive for the study's design, the theoretical framework could be further expanded to include theories on digital media consumption and evolving technological interfaces for cultural interaction .

5.2 Future Outlook

Building upon the insights gained from the Conghua project and acknowledging the study's limitations, several avenues for future research emerge to further advance the integration of drone photography in cultural education.

There remain areas requiring more comprehensive exploration. While this study demonstrated potential, deeper research is needed on the psychological and emotional impacts of creating/consuming aerial cultural narratives on individual perceptions

of place and belonging . The long-term effects of such interventions on students' career paths, cultural advocacy, and community involvement also warrant longitudinal study. Further investigation is needed into the most effective pedagogical strategies within this domain, potentially comparing different PBL implementations or alternative teaching methods .

Based on the findings and limitations identified in this study, future research is recommended in several key directions to further advance the understanding and application of drone photography in cultural education. Methodologically, there is a pressing need to strengthen research rigor by employing mixed-methods designs that incorporate larger, more diverse samples and more robust quantitative components, such as quasi-experimental designs. This would enhance the generalizability and statistical power of findings beyond single case studies . Concurrently, future research should expand the geographical scope by conducting comparative studies across multiple regions, potentially contrasting urban and rural settings or different cultural contexts, to assess the transferability and adaptability of similar educational models in varied environments . Beyond methodological and spatial expansion, exploring the integration of advanced technologies like AI-assisted analysis of aerial data or Virtual Reality (VR) visualization of heritage sites derived from drone capture into educational projects holds significant promise for enhancing learning experiences . Furthermore, critical investigation into the policy implications and the development of comprehensive ethical frameworks specifically tailored for drone-based cultural heritage projects in educational and public settings is crucial for guiding responsible implementation . Finally, refining pedagogical models through comparative studies evaluating the effectiveness of different teaching methods or specific PBL components in achieving learning outcomes related to drone skills, cultural understanding, and storytelling is needed to establish best practices in this emerging field .

5.3 Overall Contribution

In conclusion, the Conghua project served as a valuable case demonstrating the feasibility and potential benefits of integrating drone photography within a PBL framework for local cultural education. By fostering a synthesis of technical skills, creative storytelling, and cultural engagement, this approach offers a promising model for enhancing students' cultural literacy, strengthening local identity, and contributing to the documentation and dissemination of cultural heritage. While further research is needed to address limitations and explore broader applications, this study provides foundational insights for educators and practitioners in this emerging field.

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Reference

[1] Almulla, M. A. (2020). The effectiveness of the project-based learning (PBL) approach as a way to engage students in learning. Sage Open, 10(3), 2158244020938702.

[2] Bowen, G. A. (2009). Document analysis as a qualitative research method. Qualitative research journal, 9(2), 27-40.

[3] Bruner, J. S. (1991). The narrative construction of reality. Critical Inquiry, 18(1), 1-21.

[4] Cosgrove, D. (1984). Social formation and symbolic landscape. Croom Helm.

[5] Cooksey, R. W., & Cooksey, R. W. (2020). Descriptive statistics for summarising data. Illustrating statistical procedures: Finding meaning in quantitative data, 61-139.

[6] Clarke, V., & Braun, V. (2017). Thematic analysis. The journal of positive psychology, 12(3), 297-298.

[7] Cosgrove, D. (1984). Social Formation and Symbolic Landscape. Croom Helm.

[8] Duncan, J. S., & Duncan, N. C. (1992). Research on cultural landscape. In The dictionary of human geography (3rd ed., pp. 116-117). Blackwell.

[9] Fisher, W. R. (1987). Human communication as narration: Toward a philosophy of reason, value, and action. University of South Carolina Press.

[10] Hardy, J. (2017). Storytelling in organizations: Why narrative matters in great leaders. Routledge.

[11] Hatano, G., & Inagaki, K. (1986). Two courses of expertise. In H. Stevenson, H. Azuma, & K. Hakuta (Eds.), Child development and education in Japan (pp. 262–272). Freeman.

[12] Kirshenblatt-Gimblett, B. (1998). Destination culture: Tourism, museums, and heritage. University of California Press.

[13] Kaplan, C. (1994). The King's Two Genders: Questions of Difference and Representation. differences: A Journal of Feminist Cultural Studies, 6(2-3), 185-212.

[14] Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). Remote Sensing and Image Interpretation (7th ed.). Wiley.

[15] Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017-1054.

[16] Mann, C. J. (2003). Observational research methods. Research design II: cohort, cross sectional, and case-control studies. Emergency medicine journal, 20(1), 54-60.

[17] McKee, R. (1997). Story: Substance, structure, style, and the principles of screenwriting. HarperCollins.

[18] Mathiyazhagan, T., & Nandan, D. (2010). Survey research method. Media Mimansa, 4(1), 34-45.

[19] Ng, W. S., & Cheng, G. (2019). INTEGRATING DRONE TECHNOLOGY IN STEM EDUCATION: A CASE STUDY TO ASSESS TEACHERS'READINESS AND TRAINING NEEDS. Issues in Informing Science & Information Technology, 16.

[20] Phillips, B. (n.d.). Essentials of Successful Storytelling. Research Communications Toolbox, Boise State University.

[21] Piaget, J. (1972). The psychology of the child. Basic Books.

[22] Pluye, P., García Bengoechea, E., Granikov, V., Kaur, N., & Tang, D. L. (2018). A world of possibilities in mixed methods: review of the combinations of strategies used to integrate qualitative and quantitative phases, results and data.

[23] Roque, M. I. (2022). Storytelling in Cultural Heritage: Tourism and Community Engagement. In Storytelling in Cultural Heritage: Tourism and Community Engagement. IGI Global.

[24] Ryan, M. (2004). Narrative as virtual reality: Immersion and interactivity in narrative environments. Johns Hopkins University Press.

[25] Relph, E. (1976). Place and placelessness. Pion.

[26] Richter, K. F., & Winter, S. (2014). Landmarks. Springer Cham Heidelberg New York Dordrecht London. doi, 10(978-3), 1.

[27] Smith, L. (2006). Uses of heritage. Routledge.

[28] Squire, C. (2008). Methodological master class: Analysing narrative and biographical data. Qualitative Research, 8(2), 226-241.

[29] Sauer, C. O. (1925). The morphology of landscape. University of California Press.

[30] Suri, H. (2011). Purposeful sampling in qualitative research synthesis. Qualitative research journal, 11(2), 63-75.

[31] Said, E. W. (1978). Orientalism. Pantheon Books.

[32] Sheppard, S. R. J. (2012). Visualizing Climate Change: A Guide to Visual Communication of Climate Change and Developing Local Solutions. Routledge.

[33] Stauffacher, M., Flüeler, T., Krütli, P., & Scholz, R. W. (2006). Analytic and dynamic aspects of collaboration: A transdisciplinary case study of a contested transboundary waste disposal site. Global Environmental Change, 16(2), 179-194.

[34] Strand, K., Marullo, S., Cutforth, N., Stoecker, R., & Donohue, P. (2003). Community-Based Research and Higher Education: Principles and Practices. Jossey-Bass.