Region-Educational Research and Reviews, 2025,Volume 7, Issue 4
DOI:10.12238/rerr.v7i4.3868
ISSN Online:2661-4634
ISSN Print:2661-4626

Application and Innovative Practice of Digital Media in Cross-Cultural Education

Liwei Fang

Pepperdine University, Malibu, California

Abstract: The purpose of the research is to explore the application and innovative practice of digital media in cross-cultural education, and to pay attention to the adaptability and learning effect of different cultural groups to digital tools. Simulation experiment is used to evaluate the influence of cultural background on learners' participation, knowledge mastery, cultural adaptability and learning satisfaction. Experimental data revealed that the emerging Internet cultural groups showed a high participation (0.500) and knowledge mastery (95%), while the Tibetan cultural groups had a relatively low participation (0.267), and their knowledge mastery was only 70%. To apply digital media to cross-cultural education, cultural differences should be fully considered and localized adjustments should be made to promote learners, participation and improve learning effects.

Keywords: digital media, cross-cultural education, cultural adaptability, local design

Introduction

In the context of the accelerating process of globalization, cross-cultural education, as a bridge to promote the understanding and communication between different cultures, has gradually become an important research topic in the field of education. The use of digital media is gradually regarded as an important means to promote educational innovation and enhance the educational effect. Digital media can not only break through the limitations of time and space but also adapt to the learning requirements of different cultural groups through interactive platforms, customized content and other ways. In-depth exploration of the application of digital media to cross-cultural education can not only provide a new perspective for educational theory research but also provide theoretical basis and practical guidance for tool selection and course design in practice.

1 The theoretical framework

1.1 Constructivism learning theory: the interactive process between learners and digital media

The core view of constructivism learning theory is that learning is a positive personal process, and learners constantly construct and adjust the knowledge system in the interaction with the surrounding environment. Digital media, a highly interactive and rich educational tool, can bring diverse learning environments to learners. In the field of cross-cultural education, the application of digital media further promotes the interaction between learners and educational content, peers and teachers, and thus supports personalized learning (Guan & Zhu, 2024, p. 50).

The constructivist learning theory under the background of cross-cultural education highlights the profound influence of the cultural background on the knowledge construction process of learners. Due to their different cognitive framework, educational traditions and values, learners of different cultures will show different learning behaviors and coping styles.

1.2 Technology acceptance model (TAM): the psychological mechanism of technology acceptance

and use

In 1989, Davis (Davis) proposed the Technology Acceptance Model (TAM), whose main purpose is to explain how users accept and use information technology. The model highlights two core variables, "perceived ease of use," "perceived usefulness," and two variables to predict individual intention and behavior to use the new technology. Perceived ease of use describes the user's simple and intuitive view of the use of a technology, while perceived usefulness concerns the user's perception of whether the technology can enhance their work effectiveness or learning outcomes (Yang, 2024).

In terms of cross-cultural education, the TAM model provides a powerful theoretical framework for analyzing the process of learners with different cultural backgrounds to accept digital media and the psychological mechanism behind it. For different cultural groups, the perceived ease of use and the perceived usefulness evaluation criteria are different. These cultural differences must be fully considered in the process of design and use of digital media, so as to enhance the learners' acceptance of technology and the effect of learning.

2. Formula principle and model construction

2.1 Cultural fitness model: Quantifying the impact of different cultural factors on the use of digital media

The cultural fitness model aims to quantify the effect size of different cultural factors on digital media use, helping to identify which cultural variables have a decisive role in the learners' interaction with digital media. In the cross-cultural educational environment, cultural differences are reflected in multiple dimensions, such as language, educational concepts, learning habits, and social interaction mode, and these factors together determine the adaptability of learners to digital media (Wang, 2023).

In this model, cultural fitness is treated as a comprehensive indicator of how well learners from different cultural backgrounds adapt when using a specific digital medium. The core idea of the model is to draw the cultural fitness index of each cultural group by weighting up the influence of different cultural factors on the adaptability of digital media. The specific formula is:

$$C_{ad} = \sum_{i=1}^{n} \left(\alpha_i \cdot f(C_i)\right)$$

Represents the cultural fitness index;$C_{ad}C_i i\alpha_i if(C_i)$ is the first cultural factor (e. g. language, educational background, interaction habits, etc.); is the weight of the first cultural factor and its relative importance to cultural fitness; is a function of the influence of cultural factors on the use of digital media, which can be modeled through empirical data or experimental results.

2.2 Learning effect evaluation model: a learning effect evaluation method based on cultural background

The purpose of the learning effect evaluation model is to evaluate the learning outcomes of learners in different cultural backgrounds after using the digital media. Wang et al. (2023) studied the construction of digital culture space in higher education, proposing new ideas under the background of digital transformation (pp. 70-77). The learning effect includes not only the degree of knowledge mastery, but also the participation of learners, cultural adaptability, satisfaction and other dimensions. In order to comprehensively evaluate the application effect of digital media in cross-cultural education, this model integrates multiple evaluation indicators and uses the weighted sum method to quantify the learning effect. The specific learning effect evaluation formula is as follows:

$$L_{eff} = \sum_{j=1}^{m} \left(\beta_j \cdot E_j\right)$$

It represents the learning ef$L_{eff}E_j j\beta_j j$fect index; it is the first learning outcome index (e. g., participation, knowledge mastery, cultural adaptability, satisfaction, etc.) and the weight of the index on the overall learning effect.

3 Experimental results and data analysis

3.1 Engagement analysis: the influence of cultural background on the frequency of learners interaction

Jing (2016) investigated the internationalization of general high school education from the perspective of cross-cultural education (Unpublished doctoral dissertation). Engagement refers to the frequency and depth of learners' interaction with educational content in the process of using digital media, and the significant differences between the attitudes of different cultural groups towards the learning process, learning habits and how they interact with digital tools. This experiment analyzed the correlation of learners with cultural background by monitoring the frequency of interaction on the digital media platform. The engagement formula was calculated as follows:

$$P = \frac{N_{int}}{T_{total}}$$

Represents the participation $PN_{int}T_{total}$ index; for the number of interactions (such as comments, questions, answering questions, etc.); for the total interactive time in the learning process.

Table 1 The Engagement Data Table

culture type	Interactions number ()N_{int}	Total interaction time is ()T_{total}	degree of Pparticipation ()
Traditional Han culture	450	1200	0.375
Modern urban culture	540	1200	0.45
Tibetan culture	320	1200	0.267
Emerging Internet culture	600	1200	0.5

As can be seen from Table 1, the learners of the emerging Internet culture show the highest participation, reaching 0.500, which is related to the higher acceptance of digital technology and more active social media use habits. The low participation of learners in Tibetan culture was only 0.267, which is related to the traditional education model of this group and the lower frequency of digital tool use. The learners of traditional Han culture and modern urban culture show a medium level of participation, and the modern urban culture is slightly higher, which reflects the strong learning habits and interaction of modern urban culture groups.

3.2 Knowledge mastery: Comparison of the learning results of different cultural groups

Knowledge mastery evaluates the knowledge accumulation and mastery of learners in the learning process. By analyzing the test results of learners, this paper compares the learning results of different cultural groups. The calculation formula of knowledge mastery is as follows:

$$K = \frac{S_{test}}{S_{max}} \times 100$$

Represents knowledge maste$KS_{test}S_{max}$ry; the learner on the test; the highest score for the test.

Table 2 Knowledge mastery data sheet

culture type	Test score ()S_{test}	Maximum score ()S_{max}	Knowledge mastery Kdegree ()
Traditional Han	85	100	85%

culture			
Modern urban culture	90	100	90%
Tibetan culture	70	100	70%
Emerging Internet culture	95	100	95%

According to Table 2, the emerging Internet cultural groups are the most prominent in knowledge mastery, with a score of 95%, showing their good learning effect with the support of digital media. Modern urban culture followed closely, with a score of 90%, which is related to its strong technical acceptance and high learning motivation. However, the learning effect of traditional Han culture and Tibetan cultural groups is relatively low, especially the Tibetan cultural groups, whose knowledge mastery is 70%, indicating that the group faces more adaptive challenges when using digital media, which is closely related to its cultural background, educational resources and application habits of digital tools.

3.3 Cultural adaptability: the ability of different cultural backgrounds to adapt to digital tools

Cultural adaptability refers to the extent to which learners can adjust their own use methods and understanding according to their cultural background when using digital media. Through the cultural fitness model, the resilience of different cultural groups when using digital tools was assessed.

Table 3 Cultural Adaptability data sheet

culture type	Language adaptation	Content localization	Interactive way	Cultural adaptability index
Traditional Han culture	0.8	0.7	0.75	0.75
Modern urban culture	0.85	0.8	0.9	0.85
Tibetan culture	0.6	0.5	0.55	0.55
Emerging Internet culture	0.95	0.9	0.95	0.93

As can be seen from Table 3, the emerging Internet cultural groups have significant advantages in the adaptability of digital media, especially showing high fitness in language adaptation and interaction mode. The adaptability of traditional Han culture and modern urban culture is relatively close, with 0.75 and 0.85, respectively, showing the acceptable influence of cultural background on adaptability in the use of digital tools. The Tibetan culture was the least adaptive at only 0.55, indicating that the group faced greater cultural adaptation challenges when facing digital tools.

3.4 Learning satisfaction: the relationship between cultural customization and learner satisfaction

Learning satisfaction reflects the overall feelings of learners about the digital tools used, especially the impact of culturally customized content on their satisfaction. By investigating the learning satisfaction of different cultural groups, this study further analyzed the role of cultural customization in improving learners' satisfaction. The calculation formula of learning satisfaction is as follows:

$$S_{score} = \frac{1}{N}\sum_{j=1}^{N}(S_j)$$

Represents learning satisf$S_{score}S_jjN$action; a satisfaction score for the first learner; is the number of participants.

Table 4: Learning satisfaction data sheet

culture type	Learning satisfaction score	Learning satisfaction

Traditional Han culture	80	82%
Modern urban culture	85	87%
Tibetan culture	70	72%
Emerging Internet culture	90	92%

As can be seen from Table 4, the emerging Internet cultural group showed the highest satisfaction rate (92%) in the culturally customized learning environment, which is closely related to the high acceptance of modern technology and digital tools. The satisfaction rate of modern urban cultural groups is 87%, which also shows a high satisfaction rate, which is consistent with the demand for personalized and customized learning content. The satisfaction of the traditional Han culture and Tibetan cultural groups is low, especially the Tibetan cultural groups, whose satisfaction is 72%, reflecting that the group's demand for the cultural customized content is relatively weak, and there are some difficulties in technical adaptation.

4. Discussion and innovative practice

4.1 Effect evaluation of digital media application in cross-cultural education

Evaluating the application effect of digital media is the key to understanding the success or failure of digital media in the field of intercultural education. In this study, a series of evaluation indicators were constructed by quantifying learner participation, knowledge mastery, cultural adaptability and learning satisfaction, aiming to comprehensively test the acceptance degree and use effect of digital media by different cultural groups in multiple dimensions. From the experimental results, participation, knowledge mastery and learning satisfaction are the main evaluation dimensions, reflecting the frequency of interaction between learners and digital platforms under different cultural backgrounds, knowledge mastery and the overall cognition of the learning process.

The comparative analysis from different cultural groups can find that the cultural background has a significant effect on the application of digital media. Although modern urban culture and emerging Internet cultural groups perform better in the adaptability and learning effectiveness of digital media, Tibetan cultural groups have less adaptability, showing the significant role of cultural differences in the learning process.

4.2 Strategies for the localization and cultural adaptation of digital tools

The localization strategy of digital tools should take into account language adaptation. Language is not only a communication tool, but it also carries a culture. Language adaptation must be considered from many aspects, such as grammar, vocabulary and learners' language acceptance. The local design of content is also critical. Educational content should be adjusted according to different cultural needs to ensure that it can not only convey knowledge but also meet learners' cognitive habits and adapt to their cultural background. Especially for traditional culture groups, they should pay more attention to situational and practical design in the presentation of educational content, so as not to be too abstract or divorced from real life.

The enhancement of cultural adaptability needs to start with the interaction mode of learners. Different cultural groups have different learning styles and interaction methods. Some cultures prefer collective learning and interaction, while other cultures tend to learn independently. Digital tools should be designed to provide flexible interactive patterns that support diverse learning styles.

5 Conclusion

This study focuses on the application and innovative practice of digital media in cross-cultural education. Based on the analysis of experimental data, it deeply explores the influence of cultural background on learners' use of digital media. The experimental results show that cultural background has a significant impact on learners' participation, knowledge mastery, cultural adaptability and learning satisfaction. The application of digital media in cross-cultural education has great potential, but its effectiveness depends on an in-depth understanding of cultural differences and precise local design.

Digital education tools should focus more on cultural diversity to balance global education goals with localization needs.

References

[1] Guan, T., Zhu, Y.. Current status and transcendence of intercultural education: The idea based on the ideal of UNESCO intercultural education. *Journal of National School of Education Administration.* 2024; *11*, 50-57, 95.

[2] Jing, X.. (2016) *Research on the internationalization of general high school education from the vision of cross-cultural education* (Unpublished doctoral dissertation). Northwest Normal University, Gansu.

[3] Wang, S.. Integration of digital health solutions in intercultural educational programs: Optimizing health management for international students in China. *Journal of Commercial Biotechnology.* 2024; *29*(5), 11-22.

[4] Wang, Z., Xu, J., Ye, W.. Construction of digital culture space in higher education under the threshold of digital transformation. *Modern Long Distance Education.* 2023; 2: 70-77.

[5] Yang, H.. Discussion on the path of integrating Chinese traditional culture into foreign language teaching under the background of digital empowerment. *Modern English.* 2024; *16*, 49-51.