Title : Revitalize Qiang Language and Culture by Designing Serious Games Based on Interactive Projection.

Summery : The Qiang language has been on the danger of extinction, as fewer Qiang people are able to speak it. Interactive design method has brought vitality to the development of art and culture. Serious games have proven to be one of the effective methods of helping indigenous language inheritance. Research purpose is to explore whether the serious game based on interactive projections helps to revitalize the Qiang language and culture. Serious games based on projected interaction have potential to create engrossed and interesting experiences that can attract young people's interest in indigenous languages and cultures. WhiteStone has the potential to be an effective tool for conveying Qiang language and culture in a fun and interactive way. Compared with ordinary learning methods, WhiteStone achieved higher learning efficiency, although the difference was not significant due to insufficient samples. Participants in both the remote and field trials agreed that WhiteStone was able to attract their interest in learning about the Qiang languages and culture. Non-Qiang people can also be included, through the competition mechanism to stimulate the opponent's desire to get higher scores. This provides ideas for the study of other endangered languages without writing. It is also important part of protecting endangered languages to make people of other nationalities realize value of minority languages.

References

1. Alvarez, J., Djaouti, D., et al.: An introduction to serious game definitions and concepts. Serious Games Simul. Risks Manage. **11**(1), 11–15 (2011)
2. Bishop, R., Berryman, M., Ricardson, C.: Te Toi Huarewa: effective teaching and learning in total immersion Maori language educational settings. Can. J. Nativ. Educ. **26**(1), 44 (2002)
3. Bolinger, D.: Aspects of Language (1968)
4. Boulaknadel, S., Tazouti, Y., Fakhri, Y.: Towards a serious game for Amazigh language learning. In: 2019 IEEE/ACS 16th International Conference on Computer Systems and Applications (AICCSA), pp. 1–5. IEEE (2019)
5. Carew, M., Green, J., Kral, I., Nordlinger, R., Singer, R.: Getting in touch: language and digital inclusion in Australian indigenous communities. Lang. Doc. Conserv. **9**, 307–323 (2015)
6. Chen, W., Shidujaman, M., Jin, J., Ahmed, S.U.: A methodological approach to create interactive art in artificial intelligence. In: Stephanidis, C., et al. (eds.) HCII 2020. LNCS, vol. 12425, pp. 13–31. Springer, Cham (2020). https://doi.org/ 10.1007/978-3-030-60128-7 2
7. Chen, W., Shidujaman, M., Tang, X.: AiArt: towards artificial intelligence art. In: The 12th International Conference on Advances in Multimedia (2020)
8. Galla, C.K.: Indigenous language revitalization, promotion, and education: function of digital technology. Comput. Assist. Lang. Learn. **29**(7), 1137–1151 (2016)
9. Hasegan, T.: UN launches international year of indigenous languages 2019. IK: Other Ways of Knowing, p. 165 (2019)
10. Himmelmann, N.P.: Documentary and descriptive linguistics. De Gruyter Mouton **36**(1), 161–196 (1998). https://doi.org/10.1515/ling.1998.36.1.161
11. Hobsbawn, E.: Language, culture, and national identity. Soc. Res. **63**, 1065–1080 (1996)
12. Jiang, W.: The relationship between culture and language. ELT J. **54**(4), 328–334 (2000)

13. Johnson, W.L.: Serious use of a serious game for language learning. Front. Artif. Intell. Appl. **158**, 67 (2007)

14. LaPolla, R.J., et al.: Qiang. Universit¨atsbibliothek Johann Christian Senckenberg (2015)

15. Lehmann, C.: Language documentation: a program, pp. 83–98. Akademie Verlag (2014). https://doi.org/10.1524/9783050078892.83

16. Ludwig, J., Fu, D., Bardovi-Harlig, K., Stringer, D., San Mateo, C.: Serious games for second language retention. In: Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), paper. No. 9164 (2009)

17. Wang, M., He, F., Chao Deng, Q.W.: The establishment and system design of the corpus based on Qiang language. In: Industrial Design Research (Sixth Series), pp. 59–65 (2018)

18. Nettle, D., Romaine, S., et al.: Vanishing voices: the extinction of the world's languages. Oxford University Press on Demand (2000)

19. Ovide, E., Garc´ıa-Pe˜nalvo, F.J.: Internet technologies as a tool in indigenous education: the case of the Wichi people in "the impenetrable" area in Argentina. In: Proceedings of the 4th International Conference on Technological Ecosystems for Enhancing Multiculturality, pp. 441–445 (2016)

20. Plecher, D.A., Herber, F., Eichhorn, C., Pongratz, A., Tanson, G., Klinker, G.: HieroQuest-a serious game for learning Egyptian hieroglyphs. J. Comput. Cult. Herit. (JOCCH) **13**(4), 1–20 (2020)

21. Reyhner, J.: Indigenous language immersion schools for strong indigenous identities. Herit. Lang. J. **7**(2), 299–313 (2010)

22. Robles-Bykbaev, Y., et al.: An interactive educational platform based on data mining and serious games to contribute to preservation and learning of the ca˜nari indigenous cultural heritage in Ecuador. In: 2018 IEEE Biennial Congress of Argentina (ARGENCON), pp. 1–6. IEEE (2018)

23. Rogers, K., et al.: PIANO: faster piano learning with interactive projection. In: Proceedings of the 9th ACM International Conference on Interactive Tabletops and Surfaces, pp. 149–158 (2014)

24. Takahashi, I., Oki, M., Bourreau, B., Kitahara, I., Suzuki, K.: FutureGym: a gymnasium with interactive floor projection for children with special needs. Int. J. Child Comput. Interact. **15**, 37–47 (2018)

25. Tanskanen, P., Arhippainen, L.: Proposing game concepts and design recommendations for minority language learning: Karelian language. In: Proceedings of the 27th Conference of Open Innovations Association, FRUCT, pp. 374–385. FRUCT Oy (2020)

26. Tazouti, Y., Boulaknadel, S., Fakhri, Y.: ImALeG: a serious game for Amazigh language learning. Int. J. Emerg. Technol. Learn. (IJET) **14**(18), 28–38 (2019)

27. Wilson, W.H., Kamana, K.: Insights from indigenous language immersion in Hawai'i (2011)

28. Wouters, P., Van der Spek, E.D., Van Oostendorp, H.: Current practices in serious game research: a review from a learning outcomes perspective. In: GamesBased Learning Advancements for Multi-Sensory Human Computer Interfaces: Techniques and Effective Practices, pp. 232–250 (2009)

29. Wu, Q., Wang, J., Wang, S., Su, T., Yu, C.: MagicPAPER: tabletop interactive projection device based on tangible interaction. In: ACM SIGGRAPH 2019 Posters, pp. 1–2 (2019)

30. Wu, Z., Ji, D., Yu, K., Zeng, X., Wu, D., Shidujaman, M.: AI creativity and the human-AI co-creation model. In: Kurosu, M. (ed.) HCII 2021. LNCS, vol. 12762, pp. 171–190. Springer, Cham (2021). https://doi.org/10.1007/978-3-03078462-1 13