Application of three-dimensional digital contents of Silk Road in museums for history and geography education

（博物館におけるシルクロード関連の 3 次元デジタルコンテンツの歴史・地理教育への応用）

Ke Wenwen

Course of Human and Ecological Systems, Division of Environmental Science Development,

Graduate School of Environmental Science, Hokkaido University

Abstract

The "Silk Road" is an international artery for economic, cultural, technological, and religious exchanges between the West and East Asia, including China in ancient times. On the one hand, introducing these historical relics into school education classes is potentially a key to disseminate understandings of the inheritance of the Silk Road culture. On the other hand, the educational service functions of digital museums have recently become prominent. Digital museums are information service systems that collect, preserve, manage, and disseminate natural heritage digitally, based on the realization of museum functions, which can be implemented in physical museums or through the Internet. However, there is a lack of systematic research on the development and use of museum curriculum resources for students in specific educational contexts, and insufficient attention has been paid to integrating digital museums with the practical educational applications of cultures related to the Silk Road. Therefore, this study uses SFM-MVS technology to obtain three-dimensional models of Silk Road cultural relics and make the rich and convenient resources of the Silk Road culture available for school teaching. Based on the knowledge needs of students, a Silk Road-themed digital museum website is created and conduct a questionnaire survey among the students. In China, students begin studying history and geography in their first year of secondary school, and the website contains content from secondary school textbooks. The questionnaire targeted middle school students to assess whether the digital museum platform helped them understand the Silk Road through pre- and post-survey quiz scores. The results showed that middle school student's understanding of this digital museum website has contributed to the learning of geography and history education, attracted students' attention to historical geography, and increased their willingness to visit physical museums. In the context of Silk Road education, the development and utilization of 3D resources of digital museums complement the lack of research on the combination of middle school students and the practical application of Silk Road-related cultural education. The study also complements the attitudes and expectations of the student population regarding the practical educational applications of Silk Road-related culture. It is an empirical study of the effectiveness of cooperation between digital museums and secondary schools, and there are some limitations including the fact that long-term follow-up was not conducted to confirm the validity of the results and that its replicability needs to be verified. Finally, while spreading the culture of the digital museum, it further reformed the way of school education, fully reflecting the superiority of the digital museum and the school to carry out teaching activities together, which can be used as an essential form of educational resource sharing to maximize the educational function.