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主 論 文 の 要 旨

論文題目

Story-Based Computer-Assisted Language Learning
of Japanese Kanji Characters for Second Language
Learners(第二言語としての日本語学習者のためのストーリーに基づ
くコンピュータ支援漢字学習)

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論 文 内 容 の 要 旨

This dissertation proposes and investigates the effectiveness of story-based computer systems in supporting the learning process of beginning second language learners of Japanese kanji characters. Research activities consist of design, implementation, and experimental evaluation of story-based computer-assisted language learning systems. A story-based kanji learning method proposed by James Heisig in 1986 is adopted and adapted as part of the computer system designs.

The new research results include the following. Three computer systems for story-based kanji learning were designed and implemented as part of an iterative cycle of system design, implementation, and evaluation, with each system drawing on lessons from the previous system. A mobile single-user system was developed, and positive effects were experimentally verified; the system positively influenced the affective factor of learner motivation. The usability of the mobile system was also experimentally verified through the emergence of mobile learning behavior in non-fixed times and locations. Usability was also verified by the emergence of usage of the mobile system above and beyond the bare minimum required by the experiment, as evidenced by browsing, review, and hierarchical navigation behavior. To address a weakness of the mobile system – insufficient support for the learner during the story creation process – a collaborative tabletop computer system was implemented, which allowed users to participate in a collaborative kanji exploration task and to collaborate on story creation with a partner, while using augmented media provided by the system as a basis for story ideas. The collaborative nature of the system, the physical cards interface, and the augmented media were experimentally verified to have positive effects on story creation effort, exploratory activity, and learner engagement.

The experience of implementing and experimentally verifying both the single-user mobile systems and the collaborative multi-user system led to an understanding that the multi-user story-based collaborative tabletop system is better for beginners, while a single-user story-based mobile system is better for intermediate to advanced learners who have already learned how to create stories by themselves. This understanding can guide the introduction of story-based computer-assisted kanji learning technology into future classrooms teaching Japanese as a second language.

Following is a brief summary of each chapter in the dissertation. Chapter 1 explains the motivation for using stories to learn information, the difficulty of kanji learning, and the proposed approach of story-based computer-assisted language learning for kanji. Chapter 2 surveys related research in story-based computer systems and kanji learning systems, and describes the basic idea of story-based kanji learning. Chapter 3 develops and evaluates a prototype learning system using a mobile device and the audio modality; the pilot evaluation results were positive but found some weaknesses of the system. Chapter 4 improves on the design of Chapter 3, adding story storage, navigation, and sharing functions. An 8-subject, 2-week experimental evaluation confirmed that users accepted and benefited from the revised mobile system. Chapter 5 introduces a new system design to better support collaborative learning activities, and an 18-subject pair-work evaluation confirmed the ability of the system to support the learning process. Chapter 6 summarizes the results and identifies other possible application areas and topics for future research.