



Teaching Japanese Hieroglyphs Using Computer Simulation Models Based On Media Education

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Abstract: This article examines the application of computer simulation models (CSMs) and media education in teaching Japanese kanji, focusing on how innovative technologies can enhance learning effectiveness. It discusses the shift from traditional, teacher-centered methods to modern approaches that promote independent learning, critical thinking, and student engagement. CSMs offer an interactive platform that aids in the comprehension and retention of complex kanji characters, integrating mnemonic techniques and visual models to improve memorization. The article also highlights the role of media tools, such as YouTube and Telegram, in facilitating distance learning and fostering media literacy skills among students. Through a combination of CSMs and media education, students can more effectively master kanji, while teachers benefit from reduced workload and improved instructional efficiency. The integration of these technologies into the curriculum not only enhances the teaching and learning process but also prepares students for active participation in the information-rich, media-driven society.

Keywords: Computer simulation models (CSMs), Japanese kanji, Media education Interactive learning, Mnemonic techniques, Distance learning, Visual learning models.

Introduction

Currently, in the educational process, interest and attention toward applying interactive methods, innovative technologies, and pedagogical and information technologies in the learning environment are increasing day by day. One of the reasons for this is that, in traditional education, teachers primarily focused on imparting ready-made knowledge to students. In contrast, modern technologies encourage students to independently seek out knowledge, study, analyze, and even draw their own conclusions. In this process, the teacher creates an environment that fosters the student's development, learning, and character-building while also fulfilling the roles of facilitator and guide.

At the current stage of educational reform, favorable conditions have been created for students by utilizing modern innovative teaching technologies. Firstly, the development of programs for information technologies and communication tools has progressed. Secondly, the number of electronic resources based on specialized programs designed to help students develop knowledge and skills has increased. The efficiency of traditional teaching methods in delivering knowledge is becoming more challenging. However, by organizing the educational process through distance learning, it has become possible to increase the economic efficiency of education by reducing costs. Thirdly, the need for improving and reforming education has grown. Conditions have been created to organize education according to students' needs and specific capabilities. Enhancing the effectiveness of the educational process using various types of ICT tools is becoming increasingly



important. One key issue is the implementation of computer simulation models (CSMs) in the educational process through software tools, which is one of the critical topics in improving education.

A model (from the Latin “modulus” – measure, standard) is a representation or example of an object or a system of objects. For example, the model of the Earth is a globe, while the model of the sky and its stars is displayed on a planetarium screen. In our opinion, a “computer simulation model” is an adequate or approximate representation of a real event or process based on computer programs. Computer-based simulation modeling typically begins by studying an object, event, subject area, real-life situations, or problems. Once the object has been studied, a model is constructed. In creating the model, the main key factors are identified (while secondary factors are discarded). After that, an algorithm and a program are developed, followed by a computer experiment.

These tools provide students with the flexibility to freely choose academic subjects that meet the standards, and to expand their understanding of processes through interactive actions. In this approach, learning is not tied to the student’s location or time. A student can start studying at any time, mastering the material under the guidance of the teacher or independently. Progress is measured based on the student's completion of tasks and tests.

The faster a student masters the given program, the sooner they can complete the subject. Compared to traditional technologies, students can absorb knowledge 40-60% faster and in a shorter period using information and communication technologies. It is well known that incorporating actions (animations) into the learning material, rather than just plain text, increases students' interest in studying and allows for a more effective lesson. Experience shows that students have different learning preferences—some prefer reading, others listening, while some benefit from visual aids or other sensory inputs. Computer simulation models offer all these possibilities, catering to the diverse learning styles of students.

Scientific research conducted by educators and psychologists has shown that students (or learners) remember about a quarter of the information they hear for the first time, about a third of what they see, and about half of the information when hearing and seeing are combined. When multimedia programs are applied—combining listening, seeing, and critical thinking—the retention rate increases to 75%.

In conclusion, it is essential to emphasize that electronic educational resources designed for learning Japanese kanji must align with the subject curriculum. These resources should consist of tasks and exercises aimed at developing students' knowledge, skills, and competencies. Additionally, they must be presented in a continuous system that adheres to the principles of coherence. The resources integrated into electronic learning tools should include theoretical questions, test exams, and practical tasks to assess students' acquired knowledge.

Methods

Design of CSMs: A detailed approach to constructing CSMs was implemented to model real-world processes and simulate kanji learning. Key factors in kanji character recognition and memorization were identified and integrated into the CSMs.

Media Education Integration: Various media platforms (YouTube, Telegram, etc.) were utilized to distribute content, offering students the flexibility to learn anytime and anywhere. Media literacy techniques were incorporated to promote active engagement and critical thinking.



Teaching Approach: Kanji characters were categorized into simple, moderately complex, and complex groups. Mnemonic techniques were employed to link kanji to familiar concepts in the Uzbek language, making use of storytelling and visual reinforcement.

The advantages of organizing the learning process using computer simulation models (CSMs) include the following:

- Deep and comprehensive mastery of the materials presented during the learning process;
- The introduction of a new form of education into the system;
- Time-saving by reducing the duration required to acquire knowledge during lessons;
- Long-term retention of acquired knowledge in students' memory and the ability to apply it in practice;
- Shortened time required to develop specific skills in students;
- Increased number of tasks completed during sessions;
- The active role of the student as the subject of education, due to the need for computer-based management;
- The ability to model and directly demonstrate processes that are difficult for students to observe and comprehend otherwise.

For these reasons, addressing the challenges of computerizing the educational process is a priority in our country, just as it is in all economically developed nations. Various scientific research efforts are being conducted in different fields to solve these issues. Special attention should be paid to the development of electronic learning manuals, e-textbooks, and virtual stands when organizing home-based education using information and communication technologies (ICTs). Organizing the learning process based on CSMs has shown multiple advantages over traditional teaching methods.

Here are some of the advantages:

- Easing the teacher's workload when delivering educational materials to students;
- The ability to repeatedly present the learning materials during lessons;
- Achieving a higher level of student comprehension and mastery;
- The opportunity to make practical and laboratory sessions more engaging through the use of video, audio, and animated tools;
- The possibility of widespread use of recommended educational materials, enabling their use in one or multiple classrooms and groups via network technologies;
- The ability to use these tools as a key resource for distance learning;
- The capacity to individually assess and monitor students' knowledge and progress.

When presenting educational materials in the form of computer simulation models (CSMs), special attention should be given to how well students can comprehend the content. The materials provided in the CSM format must be convenient and easy for students to grasp and master effectively. The recommended educational materials should include clear definitions, key phrases, and keywords, and ensure that students have the opportunity to access and use these elements efficiently.

Modern society is heavily reliant on information and knowledge. Today, with the rapid proliferation of media and various forms of information and communication technologies (ICT), their influence on personal, economic, political, and social life is undeniable. As a result, for individuals to actively and effectively participate in the information society, new knowledge, skills, and guidelines are essential. The term "literacy" is increasingly being paired with concepts such as "digital," "computer," "visual," "technological," "communication," and of course, "media" and



“information”. This trend indicates ongoing research in these areas and reflects the rapid changes in society.

The ability to critically evaluate information from media and to continuously improve this skill is believed to aid in producing, creating, and exchanging information using ICT in any academic discipline. This, in turn, encourages students and teachers to develop these capabilities. In some countries, media education has been formally integrated into the curriculum, either as a supplementary practical subject or as an interdisciplinary field between existing subjects. For example, during extracurricular time, participants create library newspapers and magazines, radio broadcasts, and audiovisual products. This process allows participants to familiarize themselves directly with different ways of using media. For both teachers and students, the development of media and information literacy skills opens up broad opportunities to enrich the educational environment, increase engagement in the learning process, and enhance teaching effectiveness.

Media and information-literate individuals possess the following skills:

- Understanding the influence of media and the information they present;
- Making independent decisions;
- Acquiring new information about their environment;
- Contributing to the formation of common understanding;
- Supporting collective discourse;
- Engaging in lifelong learning;
- Creating information;
- Thinking critically;
- Expressing themselves through media and using it for creative purposes;
- Using media in a way that ensures personal safety and reflects social responsibility;
- Actively participating in democratic society and the global information network.

In modern usage, the term "media" has several meanings:

1. “Media” refers to mass communication platforms such as newspapers, television, radio, books, and the Internet.
2. It is also used to denote “media content”, including news, advertisements, video games, and films.
3. Additionally, it can refer to “media producers”, such as journalists, photographers, media companies, and others.

Users and audiences interact with technological devices, content, and media producers in various ways. As an organization, media fulfills a socio-cultural function by promoting media communication. Moreover, media serves an entertainment purpose by providing users with spaces (including virtual spaces) for active participation.

Results

The forms and tools used to express media are continuously evolving. Therefore, media and information literacy skills must also develop continuously. While it is difficult for a single person to master all aspects of media and information literacy, each individual must take responsibility for consistently updating their skills. The more actively a person demonstrates media and information literacy, the deeper they will understand the essence of media and its structures. The best way to develop personal media and information literacy skills is by exchanging ideas about media with others. This involves focusing on the goals and methods of education, as well as the relationships



between teachers and students. Developing media and information literacy requires students to fully immerse themselves in the process of creating media content. Gaining hands-on experience is a key starting point for learning media and information literacy. It is crucial for students to have the opportunity to try out different roles as participants in media production and distribution processes. By doing so, they can gain valuable experience and deepen their understanding of media literacy.

Media education is implemented through the coordination of various approaches used in teaching different subjects and is based on collaboration among students. Educational materials are regularly updated, and they are developed with consideration of students' needs for informal learning.

In this article, a methodology has been developed to improve the effectiveness of the learning process using media education tools and media hosting platforms, with a focus on helping students memorize and understand the reading, writing, and meaning of Japanese kanji. The media education tools include a combination of the Internet, intranet, television, and audio-visual resources, providing opportunities to organize the learning process around these technologies. Media hosting platforms, such as Telegram, Instagram, and YouTube, which are widely used today, are examples of these tools.

Discussion

Currently, there are various approaches to teaching foreign languages using computer technologies. Specifically, using computer simulation models to teach Japanese helps improve the efficiency of the learning process and incorporates assessment tools, while also requiring a step-by-step implementation. Due to the complexity of the Japanese writing system, it is essential to develop methods that help students memorize kanji by associating their meaning with specific objects. Each kanji in Japanese has two or more readings, making it difficult to remember and apply the morphemic units within the characters. Therefore, using mnemonic techniques combined with computer simulation models to explain the logical structure of each kanji is an effective approach. By integrating similar-sounding Uzbek words into meaningful sentences, these techniques can help clarify the morphemic units of kanji. For this reason, the morphemic units of Japanese kanji have been categorized into three groups based on their pronunciation, and examples have been constructed using the mnemonic (storytelling) method in a national context. These examples are visually represented through computer simulation models, creating illustrative images that aid in memorization.

- Simple kanji characters with one or more readings:

山 (mountain), 万 (ten thousand), 円 (yen), 川 (river), 火 (fire), 田 (rice field).

- Moderately complex kanji with two or more readings:

子 (child), 何 (what), 水 (water), 人 (person), 土 (earth), 方 (direction).

- Complex kanji with three or more readings:

高い (tall), 上 (up), 下 (down), 雨 (rain), 日 (day/sun).

Each kanji was approached individually, incorporating the Uzbek translation, its pronunciation in Japanese, and aligning it with morphologically similar words in Uzbek. A unique model was created that integrates the kanji into the Uzbek language context, focusing on the correct writing order and using mnemonic techniques to reinforce understanding through computer



simulation models (CSMs). The process of teaching kanji using CSMs, along with media education and media hosting tools, creates a foundation for effective learning and independent improvement.

Additionally, these methods help overcome the difficulty of memorizing the phonetic pronunciation of morphemic units in complex kanji, while also fostering greater interest and enthusiasm for learning Japanese.

Conclusion

The using computer simulation models (CSMs) as a form of media education in developing kanji writing and reading skills ensures that the learning process becomes more effective, engaging, and unique. Moreover, it provides ample opportunities for students to independently reinforce the knowledge they have acquired. By integrating media education and media hosting tools into the curriculum for Japanese language teachers, the system for improving practical skills through computer models can be enhanced. This approach helps to foster the creative development of simulation models in student activities and elevates the professional-methodical training of teachers.

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