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Effect of Generalization in Historical Learning for Acquiring Ability of Lessons Discovery

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Abstract: Historical events include lessons of good and bad behaviors of human beings. To discover these lessons, we must generalize the historical event by the basic attributes, so that we can notice the underlying patterns that commonly occur in multiple historical events. Based on this viewpoint, we have developed a learning system that supports the generalization of historical events based on the basic attributes and helps finding lessons by comparing common patterns from two generalized events. In this paper, the effect of our system is discussed based on the experimental result.

Keywords: historical learning, generalization support, lessons discovery

1. Introduction

Learning history often involves rote learning: memorizing historical events, cultures, and so on. Although rote learning demands the least amount of effort to learn the basic knowledge required, it hinders the development of critical thinking skill [1]. In addition, Prof. Trofanenko of College of Education said that rote learning makes students think of history as being really boring [2]. On the other hand, there is the idea that learning lessons from past historical events and applying them to the modern world is the very essence of historical learning. Cohen insisted the importance of "historical interpretation" for improve the way of thinking and problem solving [3]. However, discovering lessons is not focused in the historical learning in Japan, at least until now.

Various learning methods have been proposed to make students aware that similar events occur throughout history [4]. However, that none of them supports or gives methods for exploring lessons from historical events. In order to extract lessons, historical events should be observed from more general viewpoints; attribute changes of historical figures who are involved in these events.

We have proposed the learning method for discovering lessons based on the generalization of the historical events; to change the historical events into attribute changes of historical figures [5]. We have also developed the system for supporting this learning method. However, the effects of this method and the system were not evaluated. In this paper, the evaluation of our learning method and the system is described based on the experimental result.

2. Learning Method of Lesson Discovery from Historical Event and its Support System

In order to identify similar patterns from different historical events, the historical events must first be generalized, then, apprehended as typical patterns. Here, we propose the following four-step process for accomplish this.

1. **Understand historical events:** The goal here is basic understanding of the events and facts surrounding the historical episodes.
2. **Generalize historical events:** The role of key figures involved in the event and their attributes are generalized.
3. **Extract common features of historical events:** Common patterns in generalized historical events are found by comparing their attribute changes and become aware that there is repetition in historical events.
4. **Derive historical lessons:** You go beyond the discovery of common points in different historical events in Step 3 to understand and learn more generalized lessons: "What roles of figures were involved?" "Which attributes changed?" "Through what kind of event?" and "What was the outcome?"

In order to support this learning, we have proposed the system that consists of a database for historical events and four support features. The first support feature assists in generalizing the attributes of the key figures. Since historical lessons are derived from changes in situations of figures, generalized points are confined to attribute changes that affect the events. Initial generalization of human attribute changes is done at this stage. Human attribute changes can be apprehended from various perspectives. The generalization support feature makes this task easier by offering candidates of attributes: power, land, and money. The second support feature is a comparative learning support tool. Even if you look up generalized data separately, it is not easy to identify common patterns. To assist this task, a feature that displays two equivalent generalized patterns at the generalization level is provided; the student can then quickly and easily identify common aspects of the events by selecting the same attribute changes. The third support feature assists in generalizing the key figure. Here again, generalization of figure is supported by presenting candidates of different views of figures. The fourth support feature is a tool for discovering historical lessons. This fourth support feature describes generalized common patterns in simple sentences as a story. The system holds the correct answer and gives students hint for the first, the second, and the third features. The detail of the system is shown on [5].

3. Experiment

3.1 Method

Evaluations were conducted using 18 undergraduate and graduate students as subjects. The objective of the evaluations was to evaluate whether proposed learning method and our system were effective in acquiring lessons. The evaluation trials conducted in the following steps.

1. **Pre-test:** Subjects were given a short description of two historical events on a sheet of paper, then asked to compare the two events and describe any lesson learned from the exercise.
2. **Learning using the lessons discovery support system:** Subjects individually use the lessons discovery support system for practical learning to generate lessons. The subjects first implement generalizations of attributes for two separate historical events, then compare the results, and perform generalizations for the historical figures. The historical events were not the same events as used for the pre- and the post-tests.
3. **Post-test:** The post-test was conducted in the same way as the pre-test. The subjects were given short descriptions of two historical events (not the same events as used for the pre-test), and a slip of paper. They were then asked to compare the two events and tell what lesson they learned from the exercise.
4. **Evaluation questionnaire:** The subjects filled out a questionnaire giving their feedback and assessment of the proposed learning scheme and system.

3.2 Result

We analyze and assess the quality and degree of learning by the subjects using the lessons discovery system. Comparing the number of incorrect answers for the second historical event with the first event, answers improved (i.e., mistakes decreased) for 13 out of the 18 subjects and the overall average number of incorrect answers fell from 4.11 to 1.06. Regarding use of the hint button, again we find that far fewer subjects invoked the hint button when studying the second event than when studying the first event. In this case, use of the button decreased for 16 out of the 18 subjects, with the overall average fell from 9.44 times to 2.61 times. This reflects the fact that the subjects got used to the way the system operates, and learned how the generalization process worked. When asked to compare the generalized content and identify common patterns, all subjects were able to identify the correct common elements on the try using the system. In learning to generalize the key historical figures, 15 of the 18 subjects were able to generalize the right key figures on the first try using the system. Even subjects who initially chose the wrong historical figure for generalization eventually figured out the correct character by following the indication on the error screen.

Table 1 shows a summary overview of the responses received on the pre-test and on the post-test. The figures show the number of subjects (out of 18) who successfully generalized the key figures and attributes. We can see that in both the pre- and the post-tests all of the subjects were able to generalize some or all of the key historical figures included in the text. Yet, we found that on the pre-test none of the subjects was able to derive a lesson based on changed attributes of the key figures. In the post-test, the majority of them could consider attributes of figures.

Table 1. Pre-test and post-test results

	Generalization of key figures	Generalization of attributes
Pre-test	18	0
Post-test	18	14

Let us next turn to the results of the evaluation questionnaire. When asked if they thought that learning history involved awareness of attributes changes of the key historical figures, only 4 out of the 18 subjects responded "Yes." This would suggest that many students are not keenly aware of attribute changes in usual historical learning situations. Table 2 shows a summary of the questionnaire results. The subjects were asked to respond to each item on a scale of 1 to 5 (where 1 is bad and 5 is good). It is apparent from the responses to Question 1 that most of the subjects felt that awareness of lessons was an effective way to learn history. Responses to Question 2 revealed that awareness of changes in attributes of key historical figures made it easier to discover lessons. In the free comment section for Question 3, one subject commented that "I am not good with computers, but the system was user friendly and clearly explained." We can conclude that operability of the system is generally good and easy to understand. Finally, regarding overall trials, several subjects offered feedback: "Your system provides much more interesting way to learn history than reading the typical history book," "History has always been a weak subject, but I am ready to give it another shot using your approach." These responses suggest that our proposed system is fairly effective at arousing interest in learning history.

Table 2. Questionnaire results

Questions	Average scores
1. Is awareness of historical lessons effective when learning history?	4.72
2.When learning history in this lesson-conscious way, is awareness of changes in attributes of historical figures effective?	4.61
3. Did you find overall system operability simple and satisfactory?	4.61

4. Conclusion

In this paper, we evaluated the effect of the learning support system for discovering historical lessons through generalization and identifying common patterns. Experimental evaluation demonstrated that lessons discovery approach by changing historical events to attributes change is an effective method for learning history.

Currently, we did experiment only with the 18 students. We should keep evaluating with more students with different historical events. Also, the evaluation should be conducted in the real classroom. In addition, we have not evaluated the change of students' consciousness in reading the story of the historical events. One of our purposes is to make students consider lessons in reading the story, not to finish with the rote learning. We need to conduct the experiment to evaluate the change of consciousness in leading the story of the historical events.

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