Grouping System to Promote Collaborative Historical Analogy

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Abstract: The application of historical causations to modern social issue solving is considered important in history education for high school. Ikejiri & Sumikawa (2016) developed a searching system to enhance historical analogy for by comparing historical causations related to modern social issues. Additionally, the more different historical analogies there are in a group, the more collaborative historical analogy is prompted. However, there is no effective grouping system which groups students that make use of different historical analogies from each other. In this study, we propose a novel online grouping system that makes the combination of grouping students to maximize collaborative historical analogy. First, students read a news that a teacher prepares in advance. Second, each student selects one historical causation assigned one or more categories from 13 categories that can be useful for solving the social issue described in the news with the searching system. At this step, the system makes individual vectors representing what a student selected the categories. Third, to maximize the collaborative historical analogy in each group, we use two kinds of solvers that maximize scores for combinations of two students who have similar ideas and minimize scores for groups that are created by the combined two students as much as possible. As a result, pairs are automatically made composed of two students that make use of relatively similar historical analogies from each other, and groups are automatically made composed of two pairs that make use of relatively different historical analogies from each other. Finally, on the online platform, students can check the validity of their historical analogies in each pair, consider the current social issues from two different perspectives and integrate their historical analogies collaboratively in each group.

Keywords: History Education, Grouping, Collaborative Learning, Web Application, Analogy

INTRODUCTION

There has been a growing interest in historical analogy. David (2002) insists that history provides not only information on the past but also alternative solutions to similar modern issues. There have been a few cases wherein American politicians consider historical lessons when they frame diplomatic policies, which cannot be judged, based on individual experience (Abbott & Adler, 1989). Thus, learning history as the resource of analogy can help analyze the reasons behind existing modern social issues and then devise alternative solutions to confront them.

Also in history education, the application of historical causations in solving modern issues is considered important. Indeed, Japanese government's teaching guidelines for high school education (2009) considers the fostering of the ability to apply historical knowledge to modern issues to be the advanced goal.

Some researchers have developed effective learning methods to help promoting the application of historical causations in solving modern problems. For example, Mansilla (2000) examined how students successfully apply historical causations to current issues. Ikejiri *et al*. (2011) designed a competitive card game for high-school students studying world history. These researches revealed effective instructions for promoting the transfer of historical causations correctly: dividing information about causations into "problem", "solution", and "result", using history to build an informed comparative base between both past and modern cases; recognizing contextual differences between them; and checking the validity of historical analogy made by students with each other in a group composed of two pairs. Moreover, Ikejiri & Sumikawa (2016) and Sumikawa & Ikejiri (2015) developed a web application, the History Time Machine, that can help Japanese high school students of world history to search for historical causations similar to the authentic social issues and to transfer historical causations to authentic social issues appearing in recent news.

However, there is no effective grouping method for promoting collaborative historical analogy. As Holyoak & Sagard (1980) have pointed out, what each person thinks the similar historical event to modern one is up to the person. For example, some American politicians thought World War Ⅱ was similar to Gulf War, and other thought Vietnam War was similar to Gulf War. The more different historical analogies there are in a group, the more collaborative historical

analogy is prompted. Thus, the method is needed which can group students that make use of different historical analogies from each other.

Moreover, careful discussion is required using historical analogy because historical analogy often causes the misuse of analogy (Fischer, 1970). Ikejiri *et al.* (2011) insist that a group composed of two pairs in which they can check the validity of each historical analogy is effective for the collaborative historical analogy. Thus, it is important to ensure that each pair is composed of two students that draw on a relatively similar history with regard to historical analogy in order to reduce the cognitive load in the first phase. After that point, creating a group that is composed of two pairs that each draw on a relatively different history for historical analogy is important for gathering various perspectives on the same social issue featured in the news in the second phase. This method will also create a scenario which prompts students to consider current social issues from various perspectives.

In this study, we develop a novel grouping system for enhancing collaborative historical analogy. Next section summarizes how the History Time Machine finds similar events and what feature vector is created.

PRELIMINARIES

Algorithm of search engine

The History Time Machine detects similar events by counting the number of same categories attached to events. The more the same number is increased, the more similarity is also increased (Sumikawa & Ikejiri, 2015). With this system, students explore daily web news that interests them (topics that include social issues), copy and paste the text, and select categories related to the social issues of the news. After that, they can search for related historical causations, identify the similarity between the current social issues and historical causations, and use the historical causations as a resource for considering the current social issues from a new perspective (Ikejiri & Sumikawa, 2016).

Feature Vector Creation

Each historical causation in The History Time Machine is assigned one or more categories from the following 13 categories; reign, diplomacy, war, production, commerce, study, religion, literature and thought, technology, popular movement, community, disparity, and environment. The description of historical causation is composed of three sentences, "Problem," "Solution" and "Result." The following is an example.

Title: Bloc Economy in 20th C
Category: diplomacy, commerce
Description: After the Great Depression happened in 1929, each country tried to stabilize the economy (="Problem") .Then, the Great Powers made bloc economy zone among their colonies or friendly nations, and used only specific currency in order to reduce the influence of the Great Depression (= "Solution") . As a result, it intensified the conflict between these zones, small countries depending on trade got poor, and international situation has become more unstable. (= "Result") .

If historical causation is related to specific categories, these categories are tagged "1" and others are tagged "0". Thus, feature vectors of all historical causations are created in advance, as shown in Table 1.

Table 1. The example of the vectors of historical causations

name	reign	diplomacy	war	production	commerce	study	religion	literature & thought	technology	popular movement	community	disparity	environment
History 1	0	1	0	1	1	0	0	0	0	0	0	0	0
History 2	1	0	0	0	0	0	1	0	0	1	0	0	0
...													
History N	0	1	0	0	1	0	1	0	0	0	0	0	0

ALGORITHM

Overview

We show how students use the History Time Capsule for collaborative learning in Figure 1. The shadowed boxes are newly developed processes for the main History Time Capsule.

In the research phase, students select news categories. We regard the selected categories as perspectives which are concerns for students. We first combine two students with the same concerns. Then, to enhance discussions between different perspective, we create groups with different concerns. For this purpose, our algorithm creates feature vectors for all students based on the categories they select.

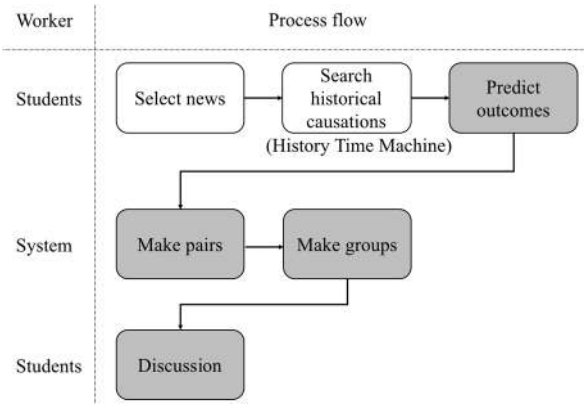

Figure 1. Overview of processes using "the History Time Capsule"

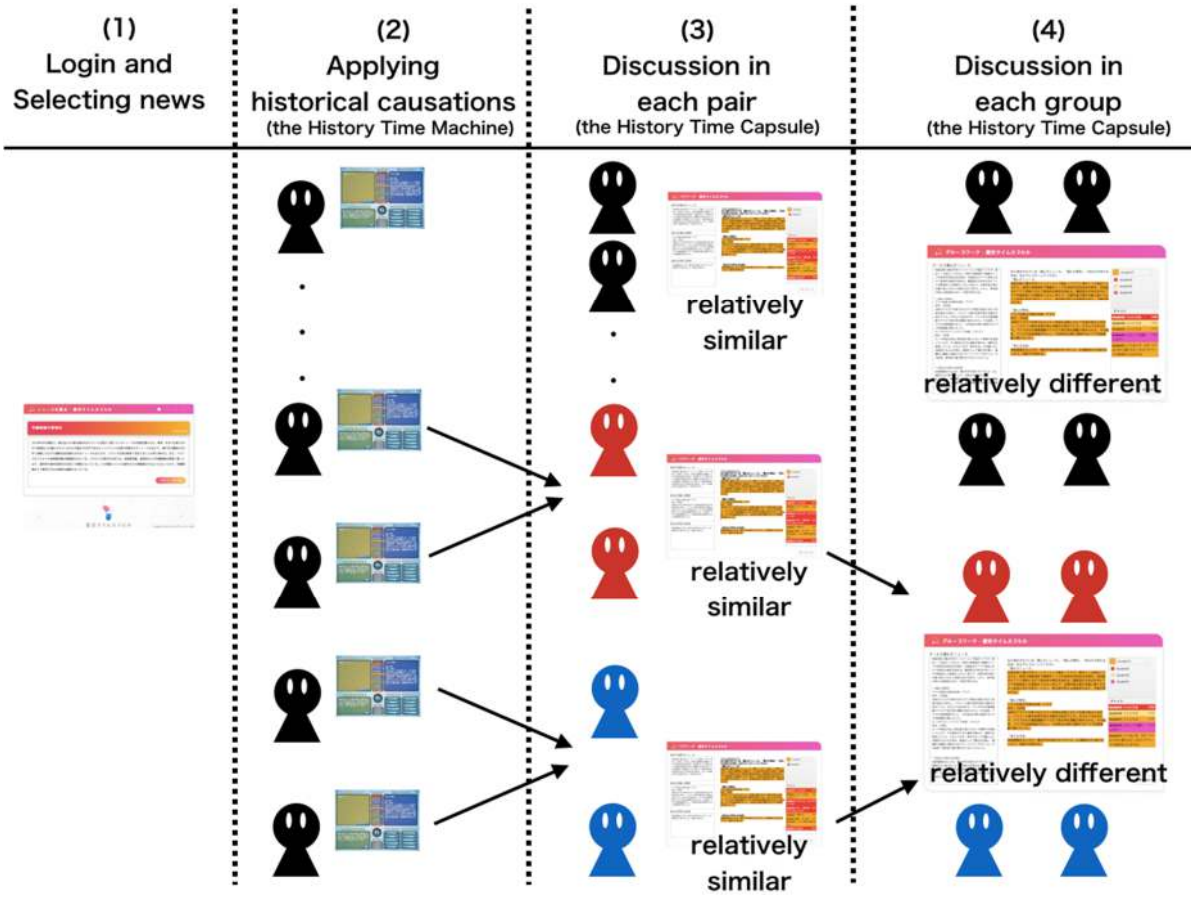

Figure 2. The image of processes using "the History Time Capsule"

Algorithm for Grouping

The algorithm for grouping uses "similarity score" that is calculated by counting the number of same "like" categories between two feature vectors. These scores are calculated in all combinations of the pairs formed from all students or all combinations of groups created from all pairs automatically. In creating the groups, the feature vector of each pair is generated by adding each number of the category (ex. the feature vector of the pair is {0, 2, 0, 0, 2, 0, 1, 0, 0, 0, 0, 0, 0} if one student selects history 1 in Table 1 and the other student selects history n in Table 1) and used for the calculation of the similarity score. Based on the calculated scores, the pairs are created in descending order of the similarity score or the groups are created in ascending order of the similarity score.

DEVELOPMENT

According to preliminaries and algorithm described above, we develop a novel online grouping system, "the History Time Capsule." We show how students use the History Time Capsule for collaborative learning in Figure 2. Once all students determine their discussions with the History Time Machine, the History Time Capsule automatically creates groups from the feature vectors. Then, students discuss with their pair or group members. The details are given as follows.

(1) Login and Selecting news

At the beginning, each student logs into the History Time Capsule by their own accounts, and selects one piece of interesting news. Note here that we assume that the accounts and news are prepared by a teacher in advance.

(2) Applying historical causations

Next, each of them searches for historical causations similar to the selected news with using the History Time Machine (Figure 3). Students select categories that are related to the social issues of the news and can search for related historical causations by clicking the search button. We expect students to identify the similarity between the current social issues and historical causations and to use the historical causations as a resource for considering the current social issues from a new perspective. From the searching result, students predict what outcomes will be obtained by applying historical causations to social issues included in the news they selected.

(3) Discussion in each pair

After all students input their outcomes with the History Time Machine, pairs are automatically formed by this system. We expect that two students in each pair make use of relatively similar history for historical analogy. Each pair collaboratively combines two documents about their outcomes input in the History Time Capsule (Figure 4). In the online collaborative writing space, they can communicate each other in the chat box. We expect them to understand their historical analogies deeply and to check the validity of them.

After finishing their combining, each pair can submit the document and waits for next grouping.

Figure 3. The interface of using the History Time Machine

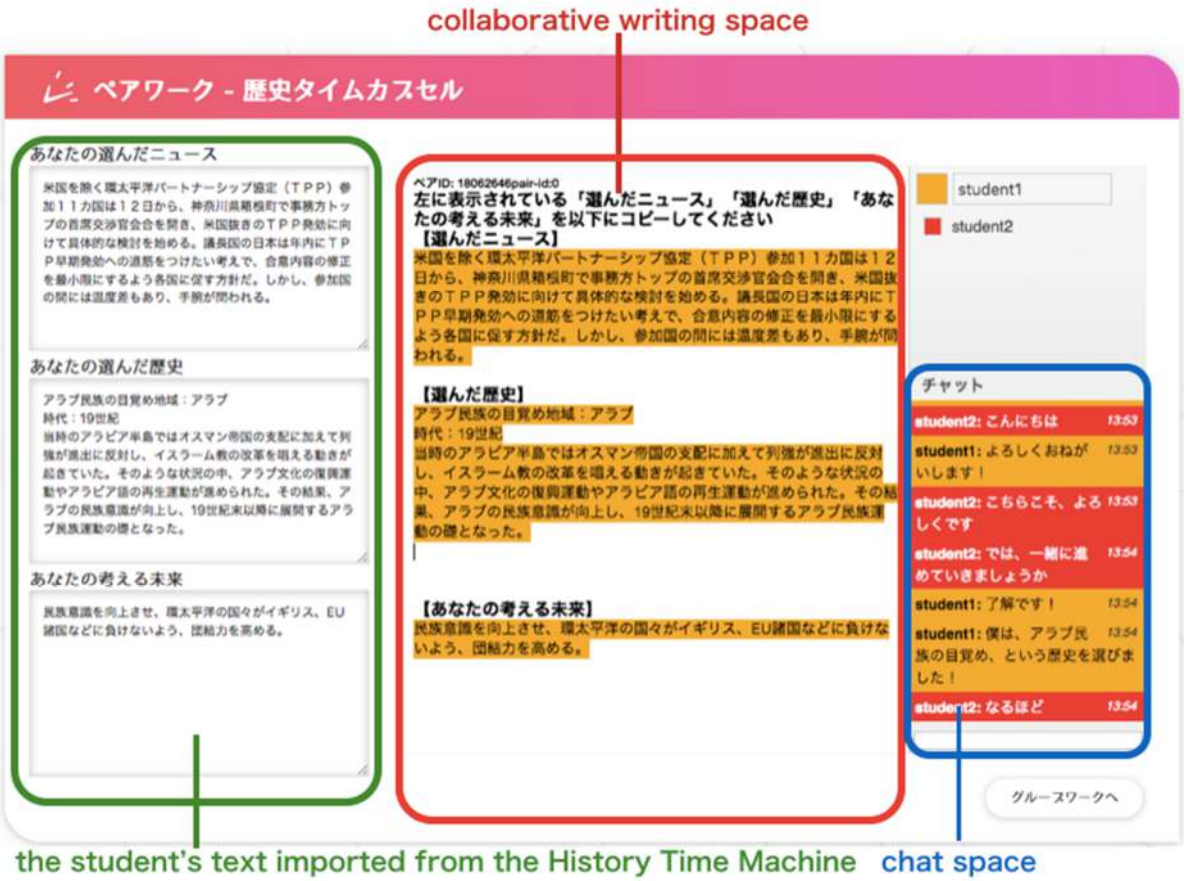

Figure 4. The interface of discussion in each pair in the History Time Capsule

(4) Discussion in each group

After all pairs submit their documents, two pairs that make use of different historical analogies from each other are automatically paired off (Figure 2). We expect them to consider the current social issues from two different perspectives; leading to check the validity of their historical analogies. They can communicate among them in the chat box. Finally, they integrate documents about their outcome collaboratively.

After each group submits the documents, each document is automatically archived as a web page which students can check anytime. So, we expect that students reflect the predicts or idea again after a set period of time.

CONCLUSION AND FUTURE WORK

In this study, we propose a novel online grouping system that makes the combination of grouping students to maximize collaborative historical analogy, the History Time Capsule.

Future work is the verification of grouping effect on collaborative historical analogy with the system by conducting the experiment for high-school students who learned world history.

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