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Investigation on the Usage Status of a Support System for Writing English Paragraph Outlines in English Classes

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Abstract: In order to write a persuasive English paragraph, it requires appropriate logical development and related knowledge. But it is difficult especially for English beginners who do not have sufficient knowledge. Therefore, a support prototype system was developed to help learners in writing paragraph outlines. This research aims to clarify issues in use of the support system through user usage and instructor evaluation as part of the evaluation of the system in the classroom environment. Using the cluster diagram diagnostic function and consistency diagnostic function in the system, we were able to diagnose both cluster diagrams and outlines which were drawn and written by students. We were also able to examine the problems or errors that occurred. Based on the results, further investigation, analysis, and system improvements are required. Especially system improvements for the beginners, it is necessary to enrich the explanations of the meanings and roles of labels when drawing the labeled cluster diagrams.

Keywords: English learning, paragraph writing, brainstorming, paragraph outline, educational practice

1. Introduction

In order to write a persuasive English paragraph, it requires appropriate logical development and related knowledge. But it is difficult especially for English beginners who do not have sufficient knowledge of English paragraph writing. Therefore, a support prototype system for organizing an English paragraph was developed (Kunichika, et al., 2019), and a survey was conducted to find out its usefulness in a classroom environment. This research aims to clarify issues in the use of the system through user usage and instructor evaluation as part of the evaluation of the system in the classroom environment.

2. Support for Writing English Paragraph Outlines

2.1 Paragraph Writing Steps

A paragraph is a collection of sentences related to one main idea. The information or opinion that the author wants to convey is presented by logically connecting multiple sentences based on a single theme. There are several steps to writing a good paragraph. Paragraph writing is performed in the following steps (Zemach, et al., 2003).

- Pre-writing: For the first step in paragraph writing, we need to collect and organize the content to be written as ideas. Then, select the ideas that we need and write an outline.
- Drafting: The next step is writing a draft of a paragraph based on the outline.
- Reviewing and revising: In this step, we examine and refine the paragraphs.
- Rewriting: For the last step, we rewrite the paragraph based on review and revision.

2.2 Methods of Support

In this research, among the paragraph writing steps, we support the users in pre-writing, such as collecting and organizing the ideas as well as writing and elaborating the outlines. This system is intended for use by beginners of English paragraph writing who have insufficient knowledge of English logical development methods.

2.2.1 Support for Collecting and Organizing Ideas

The system uses labeled cluster diagrams to support the collection and organization of the ideas. A labeled cluster diagram is a diagram which is drawn by indicating the relationships and roles of ideas as labels and connecting related ideas with one-to-one links. This system assists users to draw the labeled cluster diagrams that follow the logical development method by diagnosing the labeled cluster diagrams which are drawn by the user, pointing out any problems, and suggesting corrections to the user.

2.2.2 Support for Eliminating Consistency Errors in Writing Outlines

After collecting and organizing the ideas, we need to select the necessary ideas from the labeled cluster diagram which has been drawn. Then, we write an outline by arranging the ideas in a template that follows the structure of a paragraph. Generally, the labeled cluster diagrams and the outlines are written alternately by going back and forth between the two diagrams, due to reasons such as appear additional ideas that necessary for the structure of paragraph or the user's thoughts changing. Therefore, when writing an outline, there might be problems with the consistency between the two diagrams depending on the information contained in the idea.

Writing a paragraph without resolving the consistency issues may result in a paragraph that is not persuasive. Therefore, the author of the paragraph needs to resolve the consistency problem. The system diagnoses the consistency between labeled cluster diagrams and outlines. If there are problems or errors, the system supports the resolution of consistency errors by providing information about the contents and correction methods.

3. A Support Prototype System for Writing English Paragraph Outlines

The system consists of a labeled cluster diagram drawing tool, an outline editor, and a paragraph development schemata database. For the abstract of the support system is as shown in Figure 1.

Users first write out ideas using the labeled cluster diagram drawing tool. Here, users draw labeled cluster diagrams by linking related ideas and adding labels in order to collect and organize the ideas. At this time, the cluster diagram diagnostic function in the system would assist the user in modifying the diagram. This system diagnoses the drawn labeled cluster diagram based on the paragraph development schema. If there are any problems, it would be pointed out and the system would present suggestions for corrections to ensure that the diagram is in accordance with the logical development method.

Next, users write an outline by selecting the necessary ideas from the labeled cluster diagram that is drawn by them. Then, users arranging the ideas in a template that follows the paragraph structure displayed in the outline editor. Afterwards, users use the consistency diagnostic function to diagnose whether there are any consistency problems in the contents

of the labeled cluster diagram and the outline. If there are any problems, the system presents the contents and correction suggestions to assist the user resolve the consistency errors.

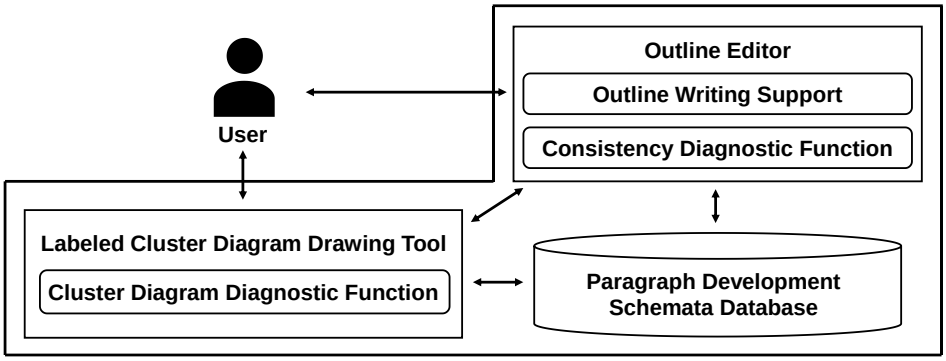

Figure 1. The abstract of the support system.

3.1 Paragraph Development Schemata

The system has knowledge about the structure of English paragraphs as paragraph development schemata (Kunichika, et al., 2009). Paragraph development schemata define logical development methods for various paragraphs. Basically, a paragraph has three parts which are an introduction part, a supporting part, and a concluding part. Even though, the details vary depending on the type of paragraph and each type has a typical structure. We obtained ten types of paragraphs after examining fifteen textbooks for paragraph writing, e.g., Arnaudet et al. (1981), Oshima et al. (1997) and Zemach et al. (2003). Those are Listing, Example, Comparison and Contrast, Objective Analysis, Definition, Classification, Opinion and Reason, Cause and Effect, Process and Direction, and Personal Description.

As examples, Figure 2 shows the structures of Listing paragraph and Opinion and Reason paragraph. Here, 0, 1, * and + express the number of repetitions. The numbers and symbols on the upper right of the component in the structure represent the number constraints of that component, * means 0 or more, + means 1 or more.

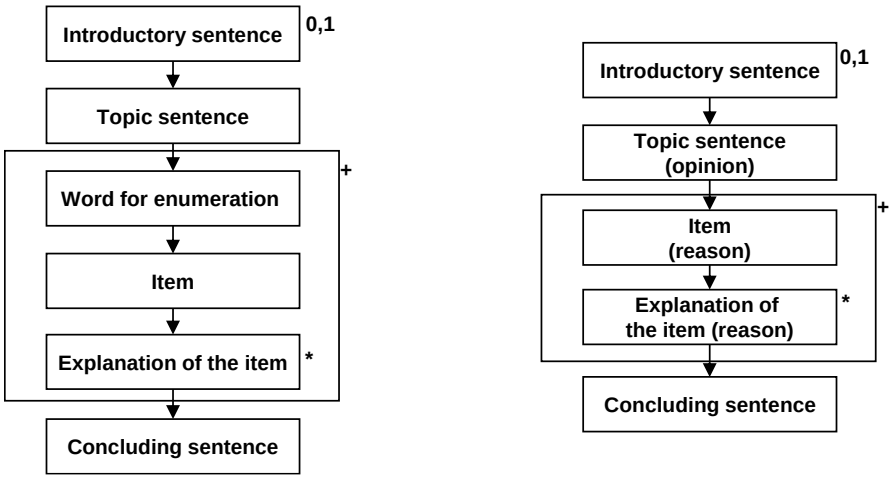

Figure 2. Examples of paragraph development schemata: left is schema of Listing paragraph and right is schema of Opinion and Reason paragraph.

3.2 A Labeled Cluster Diagram Drawing Tool

The labeled cluster diagram drawing tool is used by users to brainstorm, write down ideas, and express relationships between ideas using links. At that time, users also assign labels that represent the role of ideas. Furthermore, for each idea it is possible to write additional information: importance, order, and notes about it. For the snapshot of interface of the tool is as shown in Figure 3.

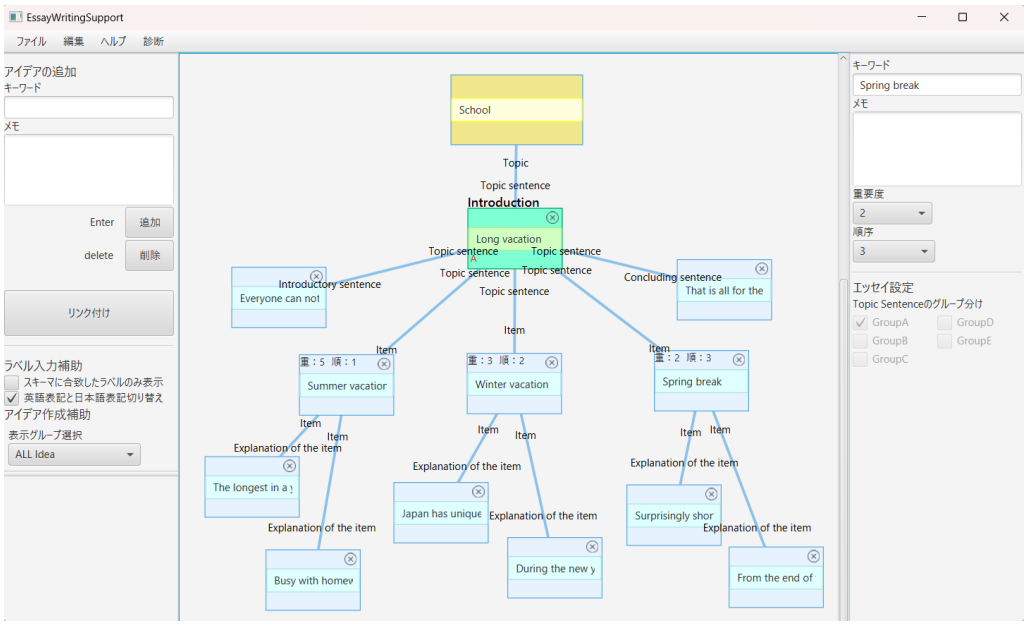

Figure 3. A snapshot of interface of the labeled cluster diagram drawing tool.

For beginners in paragraph writing, it is difficult for them to draw the labeled cluster diagrams which are necessary for writing an English paragraph. Therefore, there is a cluster diagram diagnostic function in the system. This function diagnoses whether there are conflicts between the cluster diagram and paragraph development schemata and whether it contains the required number of ideas. If there are any problems, the system would point it out and suggest corrections toward users to supporting them in drawing the labeled cluster diagrams that follow appropriate logical development methods.

3.3 An Outline Editor

Outline editor is a tool for writing an outline using ideas from a labeled cluster diagram. The user writes an outline by dragging and dropping ideas from the labeled cluster diagram onto the selected outline template. For the snapshot of interface of the outline editor is as shown in Figure 4.

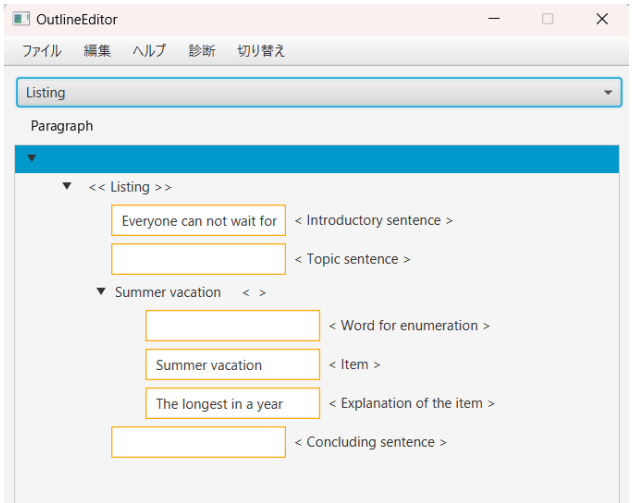

Figure 4. A snapshot of the interface of the outline editor.

Since drawing the labeled cluster diagrams and writing the outlines are performed repeatedly, inconsistencies might occur between these two tools. In order to prevent inconsistencies, this system supports the users to resolve the contradictions using an outline

diagnostic function. More specifically, the function is diagnosing links between ideas, idea duplication, idea labels, order, and importance.

4. Investigation on the Usage Status

In this research, we evaluated data from 90 subjects whose are first-year and second-year students in the School of Computer Science and Systems Engineering at Kyushu Institute of Technology with their consents to participation in the investigation. Students wrote paragraphs as the assignments presented by their instructors. They used our system both inside and outside of class for the process of collecting and organizing ideas and writing outlines. In this research, we investigated the usage status based on the contents of the submitted labeled cluster diagrams and outlines which are submitted by the users through the above process.

First, in the labeled cluster diagram, from the 77 pieces of data submitted, the number of data that could be diagnosed by the cluster diagram diagnostic function was 76 (98.7%). The total number of errors which the diagnostic function pointed out was 599, and the details are shown in Table 1. From those total number of errors, 395 (65.9%) were corrected by users. Additionally, the number of data in which all errors were removed among the diagnosable data was 31 (40.8%).

Table 1. *Detail of Errors which the Cluster Diagram Diagnostic Function Pointed Out*

	Number of errors pointed out	
	Before the support	After the support
Label mismatch	419	125
Shortage of ideas	112	45
Others	68	34
Total	599	204

Next, regarding the consistency diagnostic function, out of the 66 pieces of data submitted, the number of data that could be diagnosed for consistency by the consistency diagnostic function was 55 (83.3%). The total number of errors which the diagnostic function pointed out was 366, and the details are shown in Table 2. From those total number of errors, 223 (60.9%) were corrected by users. In addition, the number of data for which all errors were removed was 39 (70.9%) of the data that could be used for diagnosis.

Table 2. *Detail of Errors which the Consistency Diagnostic Function Pointed Out*

	Number of errors pointed out	
	Before the support	After the support
Labeling error	255	77
Link error	80	36
Idea duplication	3	10
Idea related errors	14	9
Order error	14	8
Importance error	0	3
Total	366	143

Across the two diagnostic functions, the most common cause of errors pointed out was related to labeling as shown in Table 1 and Table 2. In both Tables show that label related error accounted for about half of the causes of errors pointed out.

The results show that the total number of errors pointed out by both the cluster diagram diagnostic function and the consistency diagnostic function was 965, of which 618 (64.0%) were corrected. Therefore, we found that our system can help users correct many errors which they may not be aware of. In many writing exercises, feedback will be given on the final text,

which is the product of the task. In contrast, this system provides immediate feedback at the pre-writing stage, which is an important stage in paragraph writing, and thus encourages users to reconsider their own writing at an early stage. We think that this advantage has a positive impact on users' writing method.

On the other hand, around 36% of errors remain uncorrected. To find out the reason, we conducted a survey among the related users. From the survey results, it revealed that the main reasons why errors were not corrected by the user are because some of users experienced that correcting one error causes another error (10 users), did not understand what each label means or how to use it (9 users), and did not know how to correct the errors (6 users). Further investigation, analysis, and system improvements are required. Especially system improvements for the beginners, it is necessary to enrich the explanations of the meanings and roles of labels when drawing the labeled cluster diagrams.

We also asked the three teachers in charge of the English subject how they evaluated this system with 5-grade Likert scale (5 points being the highest score). They have taught paragraph writing without tools for some years and based their answers on such backgrounds. As a result, high evaluations of 4.7 points were obtained on average for the questions "Is this system useful for paragraph writing?" and "Do you want to continue using this system in the class?". On the other hand, the average score for the question "Is this system easy for students to understand?" was 3.7 points, which was low compared to the others. Reasons cited include the need for time to get used to the system's operation.

5. Conclusion

In this research, we investigated the usage status of a support prototype system for writing paragraph outline in English classes and analyzed the assignments. Using the cluster diagram diagnostic function and consistency diagnostic function, the system is able to diagnose the cluster diagrams and outlines which are written by students and examine the errors. It was found out that the system can help users correct many errors but some of them did not correct the errors that related to labeling. Although the system received high praise from the English course instructors in terms of class guidance, several areas for improvement were raised regarding the system's ease of understanding for students.

In the future, we will improve this system that makes it easy for users to understand the content and operations. For example, we have a plan of the enhancement of explanations regarding the labeling.

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