

Narrative Introduction Text Generation Support System According to Reader Preferences

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Abstract: In order to accomplish learning through extensive reading, readers need to be interested in the narrative. To entice readers to read a narrative, it is necessary to have an attractive and engaging introduction. However, this can be difficult, as reader preferences vary. An attractive introduction should provide "empathy" and "unexpectedness." To support creating such an introduction, this study proposes a method for extracting common and different narrative elements according to the reader's preferred category. This study also proposes a system that supports the extraction of such common and different narrative elements by considering typical elements of the identified category.

Keywords: Narrative, introduction, empathy, unexpectedness, category

1. Introduction

One of the way to improve reading comprehension and language skills is extensive reading. To support language learning through extensive reading, there is a system that automatically stores unfamiliar words and create flashcards (Kato, J. et al., 2021). This system helps students to learn words easily. However, if students are not motivated to read, learning through extensive reading will not be successful. Therefore, it is necessary to motivate students to read narrative. An introduction may be included to motivate the reader to read narrative. If the introduction can attract the reader's interest, motivation to read narrative will increase. Therefore, the objective of this research is to construct a system that supports narrative introduction creation that fits the readers' preferences.

Several studies try to introduce narratives. Kango et al. constructed a system for creating advertising slogans (Iwama & Kano, 2018). Slogans replace contents with a single phrase, which is too brief to convey the content. Li et al. developed a system that creates illustrations that follow the narrative automatically. This system uses the illustrations to convey the narrative in an easy-to-understand manner but does not consider the readers' preferences. To attract readers, it is necessary to create introductory text that summarizes the contents from the viewpoint of the readers' preferences.

Minal et al. proposed a movie recommendation system according to user preferences. This system models the movies that the user watched and recommends movies that are similar to what the user has watched before (Minal & Sneha, 2021). However, if the recommended movies are similar to what the user has already seen, the viewer may not be interested. What attracts users is something that is new (unexpectedness) among those that match their preferences (empathy). Therefore, this study proposes a method for detecting empathy and unexpectedness components from the narratives and constructs a support system for extracting such components according to this method.

2. Creation Process of Introduction that Attracts Reader's Interest

2.1 What Attracts Reader's Interest?

Narratives in the same category include common components, which we call typical components (Murai, et al., 2022). For example, in the category of "mystery," "locked room," "murder," and "detective" are typical components. Such components are those that characterize the category. In addition to the typical components, there are components that often emerge with the typical elements. For example, detectives usually wear long trench coats. These components are regarded as sub-typical components.

Empathetic components, which are typical components of the category, are attractive to readers. However, simply presenting empathetic components is not sufficient to draw them in (Zhang, 2013) because they are common. For example, if the introduction simply says, "This is a love story in which the hero and heroine meet at school and gradually fall in love with each other," readers will likely not be intrigued because the introduction is composed of the usual elements of a love story.

Unexpectedness attracts reader interest (Ziarama & Ravanmehr, 2021). Components that are not typical of the preferred category bring about unexpectedness. For example, if the introduction says "This is a love story in which the hero and heroine meet at a courthouse and fall in love with each other," "courthouse," which is not often seen in love stories, is an unexpected addition that may arouse reader interest. Therefore, this research defines empathetic components and unexpected components as components that should be included in the introduction.

2.2 Introduction Creation Process

Figure 1 illustrates the general process of creating an introduction when there are no target readers. First, after understanding the contents of the narrative, the components to be introduced are selected from the contents. The introduction is then written using the selected components.

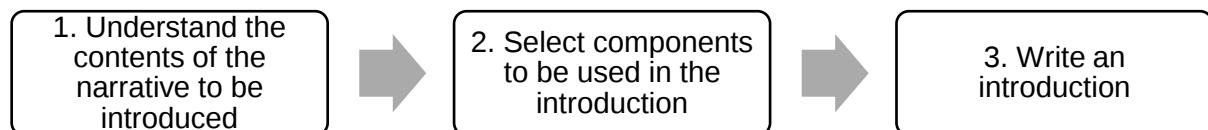
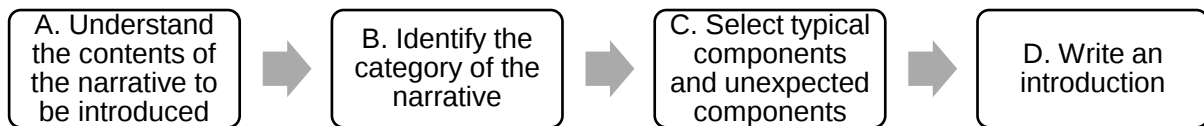


Figure 1. Process for Creating an Introduction without Assuming Reader

The process of creating an introduction that considers the preferences of the reader is shown in Figure 2. After understanding the contents, the category of the narrative is identified. The narrative may belong to several categories, but the one that is preferred by the reader is selected, as the reader may not be interested in a narrative of a not-preferred category. After that, the empathetic components and unexpected components are selected to create the introduction.

We show an example of creating an introduction of a narrative using "The Little Prince" for readers who prefer "fantasy" and "love" categories. In Step A, scenes are confirmed such as "traveling to various planets in space," "talking to a fox," and "talking to a rose." In Step B, the "space" category is detected from the scene which is set in "space" and the "fantasy" category is detected from the action of "traveling to the stars." Then, "fantasy" is selected to create an introduction. In Step C, "animals (foxes) exist as characters" was derived as a typical component of "fantasy" and "traveling to the stars" was used to detect the category; these can be extracted as empathetic components. On the other hand, "the plant (rose) exists as a character" was derived as an unexpected component.



3. Support System

This research proposes a system that follows the introduction creation process shown in Figure 2 and provides support to facilitate the smooth creation of an attractive narrative. Even if introducer of the narrative know the proposed process, it may not be easy to execute the individual steps. In Step A, the narrative must be understood in terms of extracting empathetic components and unexpected components. However, the types of components that can become such components is not clear. The proposed system defines components and relations to understand the narrative as a narrative frame and assists in understanding the narrative according to that frame. In Step B, some categories are difficult to detect because the method of finding typical components is not defined. Since typical components appear in specific types of components, the proposed system highlights components that could be the typical elements of the category. In Step C, the system supports recalling sub-typical components. Since sub-typical components are components that are associated with the typical components, the system gives questions for already derived typical components to recall components that are often seen with them. In addition, according to the derived typical components and sub-typical components, the system provides unexpected and empathetic components candidates.

Figure 3 shows the system configuration. The system has a narrative database to hold the organized narrative contents and a typical component database to hold the derived typical components and sub-typical components input by the user. The narrative organizing interface as shown in Figure 4 is for Step A and provides the interface for organizing narrative contents according to narrative frames. Narratives consist of character action, so it is necessary to understand the actions and the relationship between them. Some actions are crucial in the narrative and some are not. Therefore, this research defines the narrative frame as sets of actions consisting of the contents, the characters who perform them, and the importance of the actions. The importance takes the value of essential, necessary, and unnecessary. In addition, since the actions occur in sequence, there is a sequential relationship between them. On the other hand, actions are taken in certain places with certain people at certain times. They are often common to multiple series of actions. This study considers these common factors as a scene that includes individual actions.

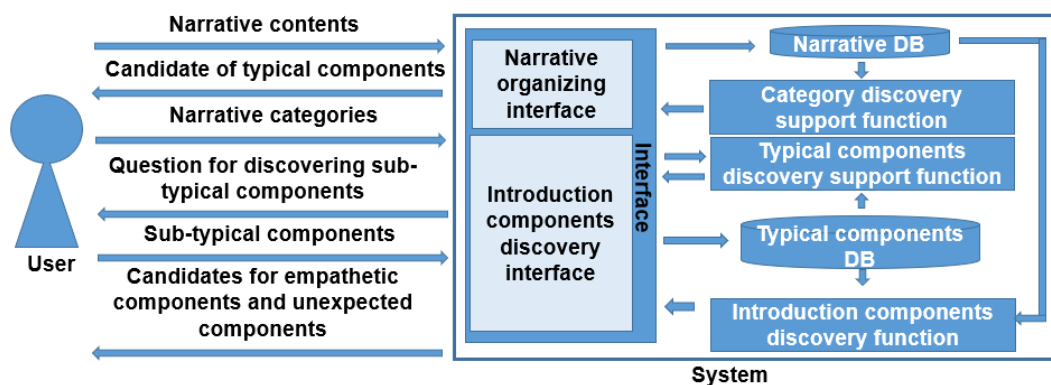


Figure 3. System Configuration

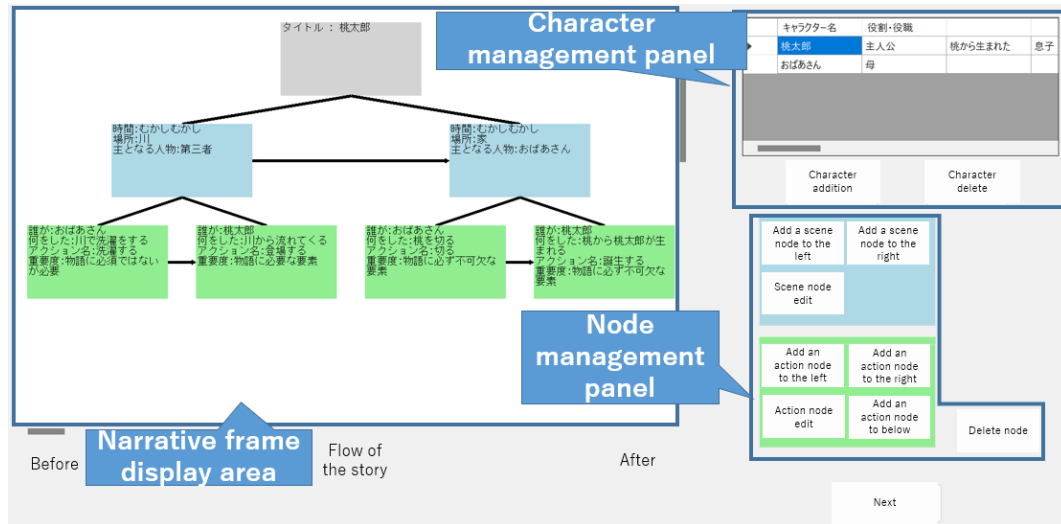


Figure 4. Narrative Organization Screen

For Step B, the category discovery function supports for identifying the category. It highlights the types of components of the narrative frames organized in the narrative organization interface. To identify the types of typical components that characterize categories, we investigated the typical components of 35 categories obtained from web pages of movies (MovieWalkerInc., 2024), comics (BeagreeInc., 2024), and novels (Hina Project Inc., 2024). From them, we identified 27 categories by "place and time," "action," or "characters." For example, the category "school" is characterized by place and "historical story" by time. The other 8 categories were not characterized by components, such as expected reader types. Therefore, in our system, typical components to identify the categories are defined as one of the following: "place and time," "action," or "characters." This interface provides three modes that highlight different types of nodes respectively: a scene node that consists of place and time, actions nodes of selected characters, and action nodes with high importance. Highlighted nodes are painted with different colors from other nodes.

For Step C, the typical element discovery support function supports for finding sub-typical components after a category has been identified from the main typical elements. Ashida et al. proposed a method to support deriving contents for creating narratives by asking questions using already derived narrative components (Ashida & Kojiri, 2018). Our system applies this method for deriving sub-typical components from already derived ones. Questions are defined for each type of derived component. The following are specific examples when "school" was found as a typical component of the "school" category: *When (which era) is the typical scene for "school"?*, *Which place is often seen next to "school"?*, *Which place is often seen before "school"?*, *Who (which characters) are often seen at "school"?*, *What events or actions often occur in "school"?*. If the user answers "student" to the last question, then "student" becomes the derived sub-typical element and questions with "student" are generated.

The empathetic and unexpected candidate presentation screen shown as Figure 5 extracts the empathetic and unexpected components from the components of the narrative and the typical components of the category. For example, suppose that "swimming (action)" in "summer (time)" are the typical components of the "school" narrative and the target narrative has scenes of "swimming in summer" and "swimming in winter." The former scene is introduced as an empathetic component and the latter scene as an unexpected component. Candidates for empathetic and unexpected components are displayed in the empathetic and unexpected components selection panel.

4. Evaluation Experiment

4.1 Experiment 1

We conducted an evaluation experiment to assess the following four evaluation items:

1. The effectiveness of the system for deriving empathetic and unexpected components.
2. The effectiveness of the narrative frame in organizing and understanding the narrative.
3. The effectiveness of the category discovery support function.
4. The effectiveness of the typical components discovery support function.

Seven undergraduate and graduate students (A~G) participated in the experiment using the following experimental procedure. In Step 1, the participants were asked to determine the narratives from the list, which was prepared from a collection of short comics (Nishio, et al., 2015). In Step 2, the participants were asked to imagine the target readers for whom they would make the introduction and to freely create the introduction. In Step 3, we explained the components of an attractive introduction, such as empathy and unexpected components. Then, we asked the participants to discover empathetic and unexpected components, and create an introduction with them. In Step 4, the participants were asked to find categories using the narrative organization screen to discover categories and in Step 5 they were asked to find categories using the category discovery screen. In Step 6, they were asked to create an introduction using the empathetic and unexpected components candidate presentation screen. Finally, in Step 7, they were asked to answer the questionnaire shown in Table 1.

Table 1. Questionnaire Items

Q1. Did you gain a better understanding of the contents by using the narrative organization screen? Choose from 1 (definitely no) to 4 (definitely yes).
Q2. Did the narrative organization screen help you organize your narrative? Choose from 1 (no) to 3 (yes).
Q3. How much do you usually watch narratives (novels, manga, movies, dramas, etc.)? Choose from 1 (not at all) to 4 (very often).

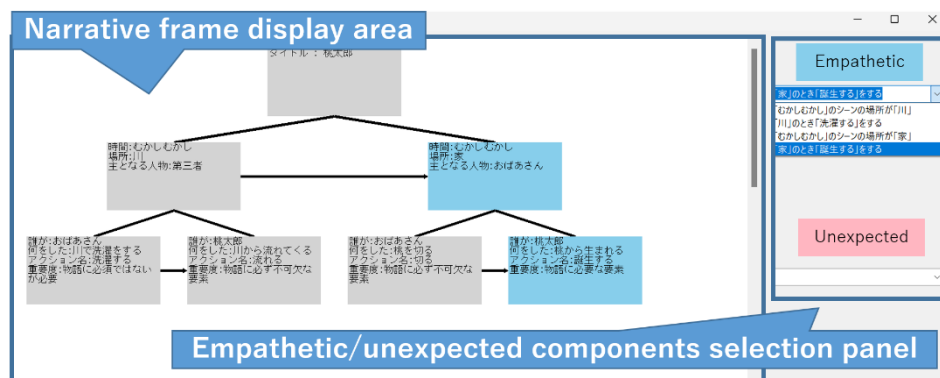


Figure 5. Empathetic and Unexpected Components Candidate Screen

The results of the questionnaire are shown in Table 2 and the number of categories found in each step is shown in Table 3. Table 4 shows the number of empathetic components and unexpected components found before and after the use of the system. The number of typical elements found using the typical components discovery support function (Step 6) is shown in Table 5.

Table 2. Results of the Questionnaire

Item	A	B	C	D	E	F	G
Q1	4	2	3	3	4	3	3
Q2	3	3	3	3	3	3	3
Q3	4	3	4	2	4	4	4

Table 3. The Number of Categories Found

	A	B	C	D	E	F	G
Category1	4	4	2	5	4	3	3
Category2	4	4	3	5	4	3	3
Category3	6	6	4	8	12	9	6

Table 4. *The Number of Empathetic and Unexpected Components Before and After Use of System*

		A	B	C	D	E	F	G
Empathetic components	1 (before)	1	1	1	1	1	1	1
	2 (after)	2	3	4	3	2	3	1
Unexpected components	1 (before)	1	1	1	1	1	1	1
	2 (after)	2	3	1	2	3	4	2

Table 5. *The Number of Typical Elements Found in Step 6*

A	B	C	D	E	F	G
14	9	10	6	18	12	10

Let's discuss evaluation Item 1. According to Table 4, six participants were able to find new empathetic and unexpected components after using the system. This suggests that the system was able to help derive empathetic and unexpected components. Evaluation Item 2 was evaluated from the results of Q1 in Table 2. Six participants answered 3 or 4, which indicates that the use of the narrative organization screen helped them understand the narratives. In addition, all participants selected 3 for Q2 and several participants commented, "I noticed some components that I had overlooked (by organizing with the narrative frames)." These results indicate that the narrative frame is effective for organizing and understanding the narrative contents. For evaluation Item 3, since Table 3 shows that all participants were able to discover more categories, the category discovery support function was found to be effective in discovering categories. For evaluation Item 4, according to Table 5, more than six typical components were found using the typical element derivation screen. The correlation between the number of found components and the answer to Q3 shown in Table 2 has a strong positive correlation. These results suggest that the typical components finding support function is effective, especially for those who are familiar with narratives.

4.2 Experiment 2

The objective of this experiment is to evaluate the validity of the components that attract readers, such as empathetic components and unexpected components. The introductions of narratives created in Experiment 1 were read by participants who match the target reader of the introductions. The participants were nine undergraduate and graduate students (H-P) who were asked to rank Introductions 1, 2, and 3 from 1 (best) to 3 (worst). They were also asked to provide the reason for their rankings. Since Introductions 2 and 3 were created after the explanation of the empathetic and unexpected components, the validity of the components can be evaluated if the ranks of Introductions 2 or 3 are better than Introduction 1. During the experiment, the number of narratives whose ranks of Introductions 2 and 3 were better than that of Introduction 1 was 14 out of 22. A chi-square test was conducted with the hypothesis that there was no difference between the selection of Introduction 1 and the selection of Introductions 2 and 3 for the first or second rank. The result shows a statistically significant difference ($p < 0.05$, $\chi^2(1) = 13.6$, $p = 0.000222$, $\phi = 0.05$). This suggests the validity of the empathetic and unexpected components for an attractive introduction.

5. Conclusion

In this paper, we defined an introduction that attracts the expected reader's interest and proposed a process for deriving them. We also constructed a system that can derive the components according to this process. The results of the evaluation experiments suggest that introductions with empathetic and unexpected components from the reader's preferred category attract readers. It also became clear that the proposed process and its supporting

system contributed to a deeper understanding of the narrative and to the discovery of the empathetic and unexpected components. However, we also found that some derived components were not empathetic and unexpected components. In the future, we would like to support the derivation of components that can give enough empathy or unexpectedness.

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