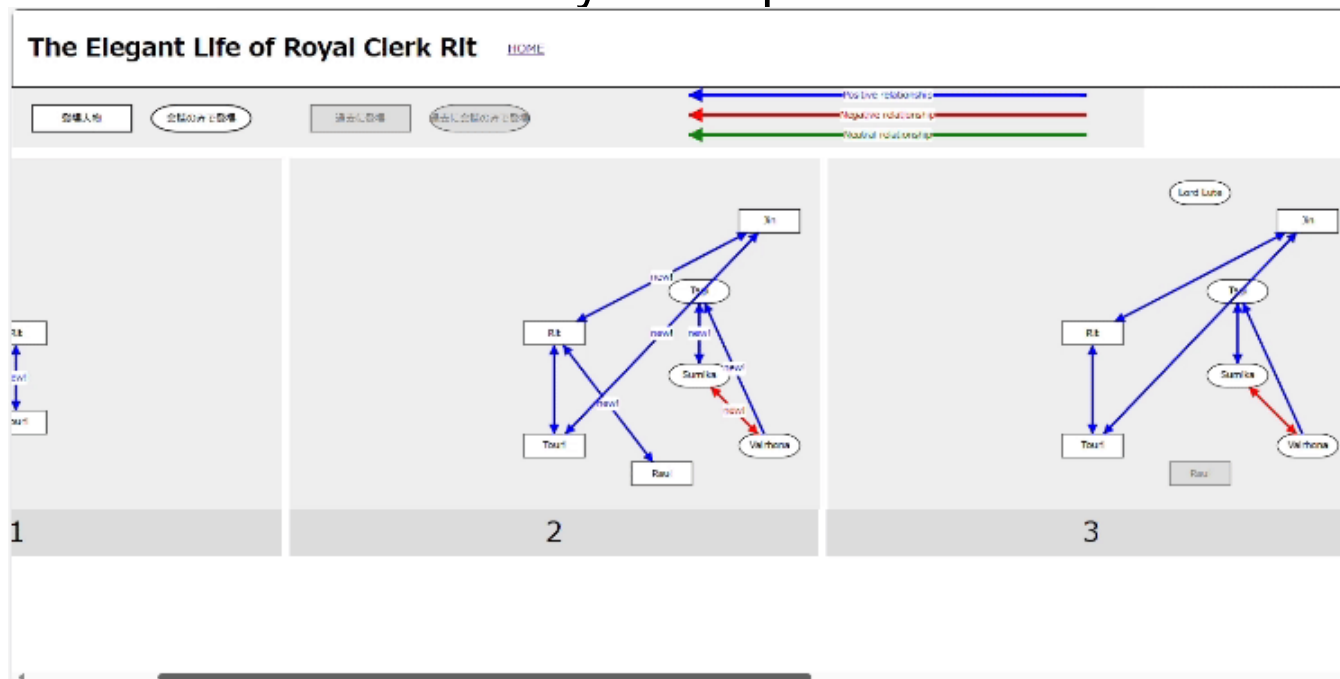


Events Remembering Support Via Character Relationships' Visualization of Novels

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Our proposed interface

- The relationships between characters are visualized by each episode and are presented in chronological order of number of episodes.
- The visualized relationships and their changes support for readers in remember the events in the “already-read” parts.



[The novel posting site "Become a novelist" \(syosetu.com\)](http://syosetu.com)

The Elegant Life of Royal Clerk Rit

Research background

1. When people read a long novel, they usually find it difficult to finish it at once.
2. Therefore, people have to repeat the "read-and-pause" step before finishing a story.
3. This would cause a lot of confusion in the reader's memory.
4. If they continue reading without remembering what they have already read, **it becomes difficult for them to understand the events of the story.**



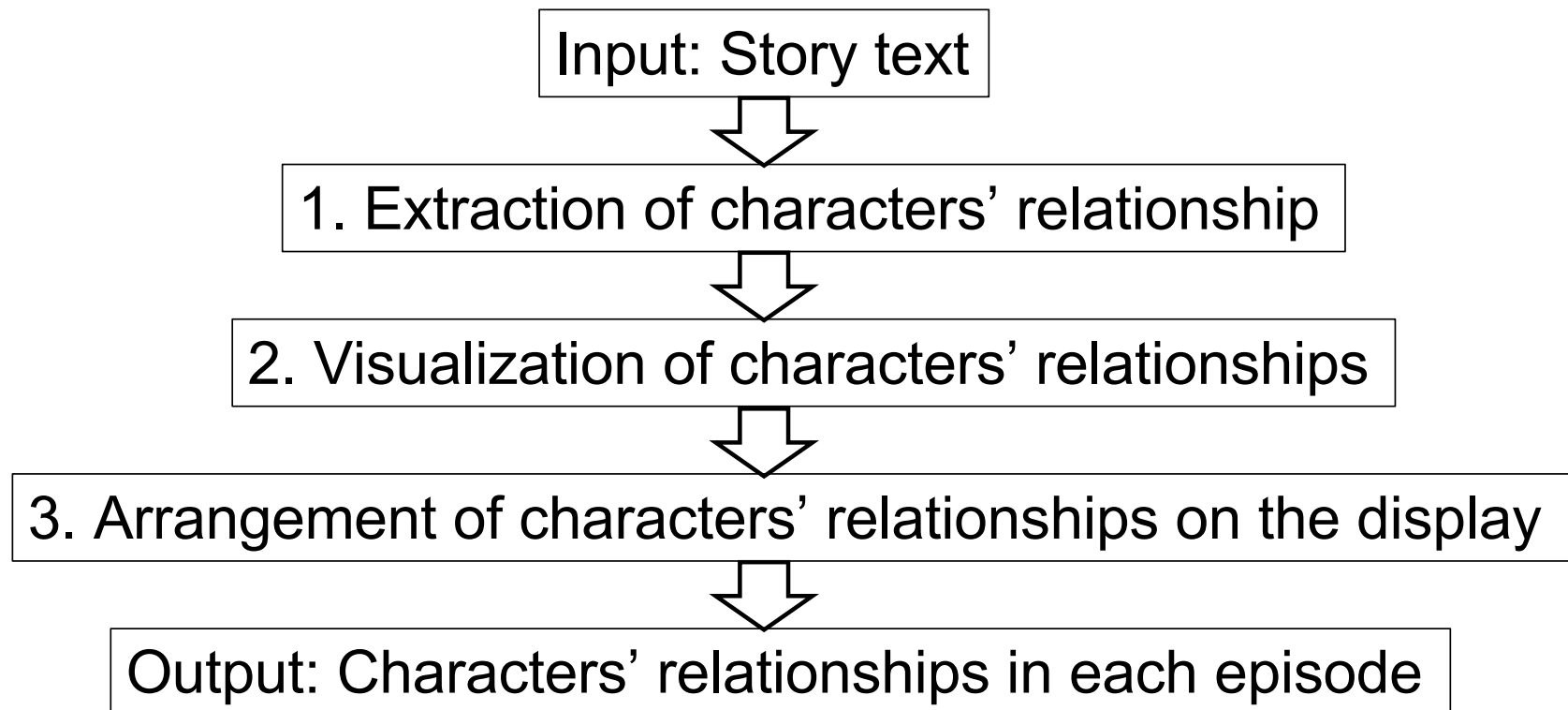
Purpose of research

- Readers may forget the characters and the events they were involved in.
- If this problem is solved, readers will be able to “read-and-pause” smoothly.



The authors propose an interface that supports to remember the events of an online novel by **visualizing the relationships between the characters.**

Flow of the proposed interface (1)



Flow of the proposed interface(2)

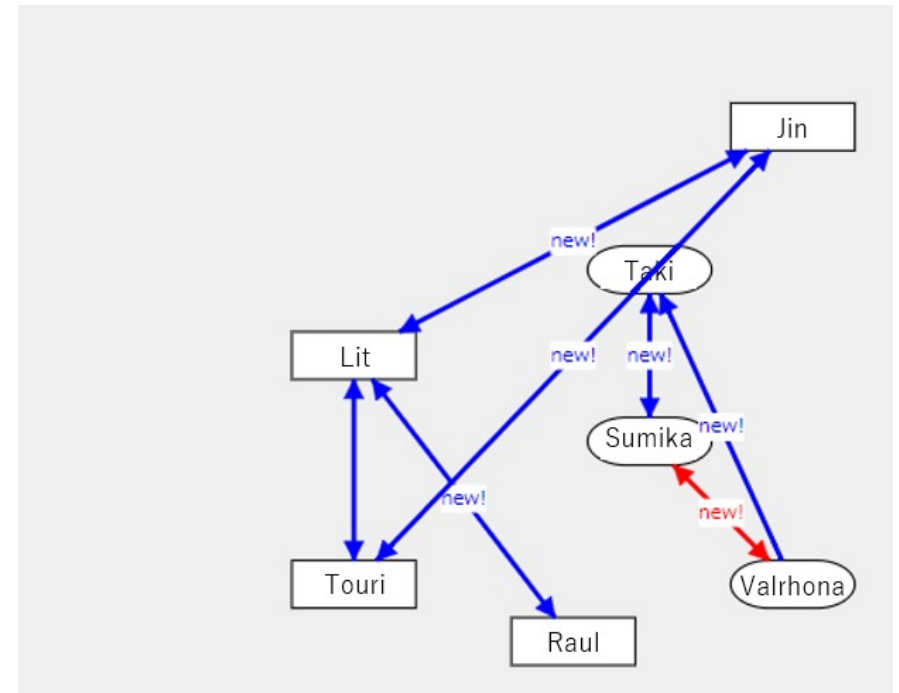
1. **Characters' relationships** are extracted from the novel text.

Title:The Elegant Life of Royal Clerk Rit
Ignoring the cold stares from Jin and Touri, Rit urged her to continue.
"The second prince is Tagi's fiance..."
Yuri took over from Targa.
"Her name is **Philberd Valona.**"
"I see. **Is that lady's behavior really that outrageous?**"
The two knights nodded.
Targa said that she once poured a glass of water over a maid in the castle she didn't like.
Yuri said that she used the fact that she was his fiance to blackmail the second prince for expensive jewelry.
"**Her latest target is Miss Sumika of the Scott family.**"
Targa sighed, and Rit tilted her head.

From the dialogue, we can see that **Valona has a negative relationship with Sumika.**

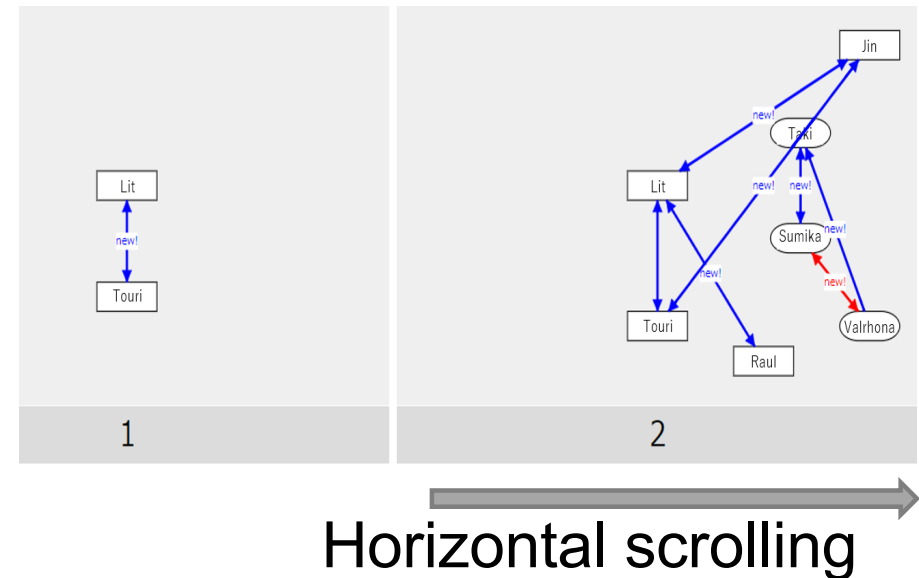
Flow of the proposed interface (3)

2. A characters' relationships visualization is created for each episode from the extracted characters' relationships.



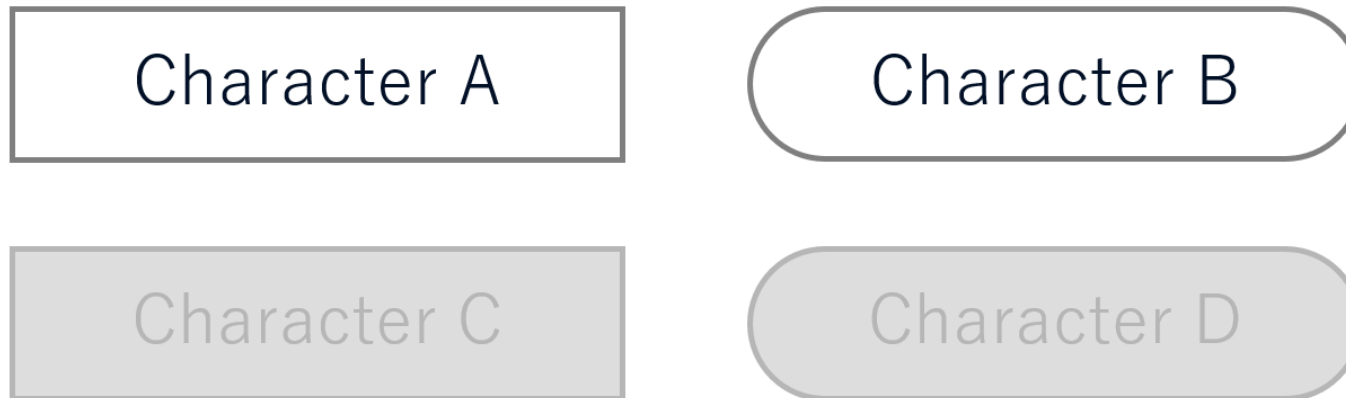
Flow of the proposed interface (4)

3. The created character relationships visualizations are arranged and presented **in chronological order by episode number.**



Extraction of characters' relationships (1)

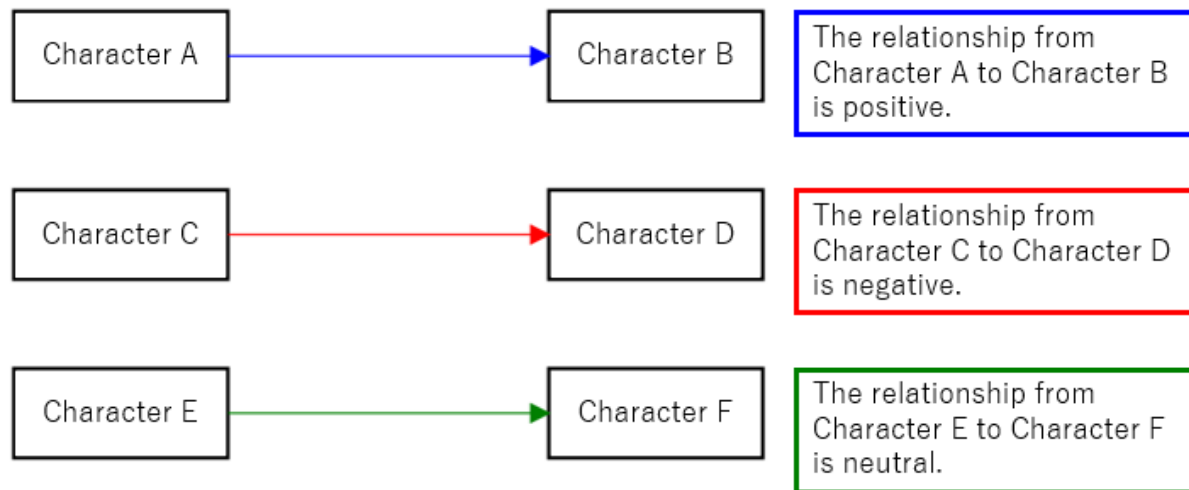
- The authors extract **four types of characters** from novel texts for each story.



- (A) Characters who are actually acting in the episode
- (B) Characters who are mentioned in the conversations
- (C) Characters who acted in the past episode
- (D) Characters who were only mentioned in past conversations

Extraction of characters' relationships(2)

- The authors extract the following **three types of relationships** between characters from novel texts.

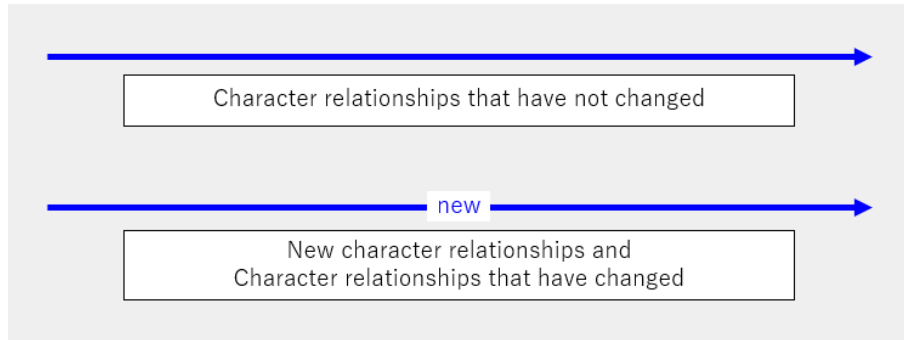


Positive relationship: allies, friendships, etc.

Negative relationship: hostile relationship, dislike of the other person, etc.

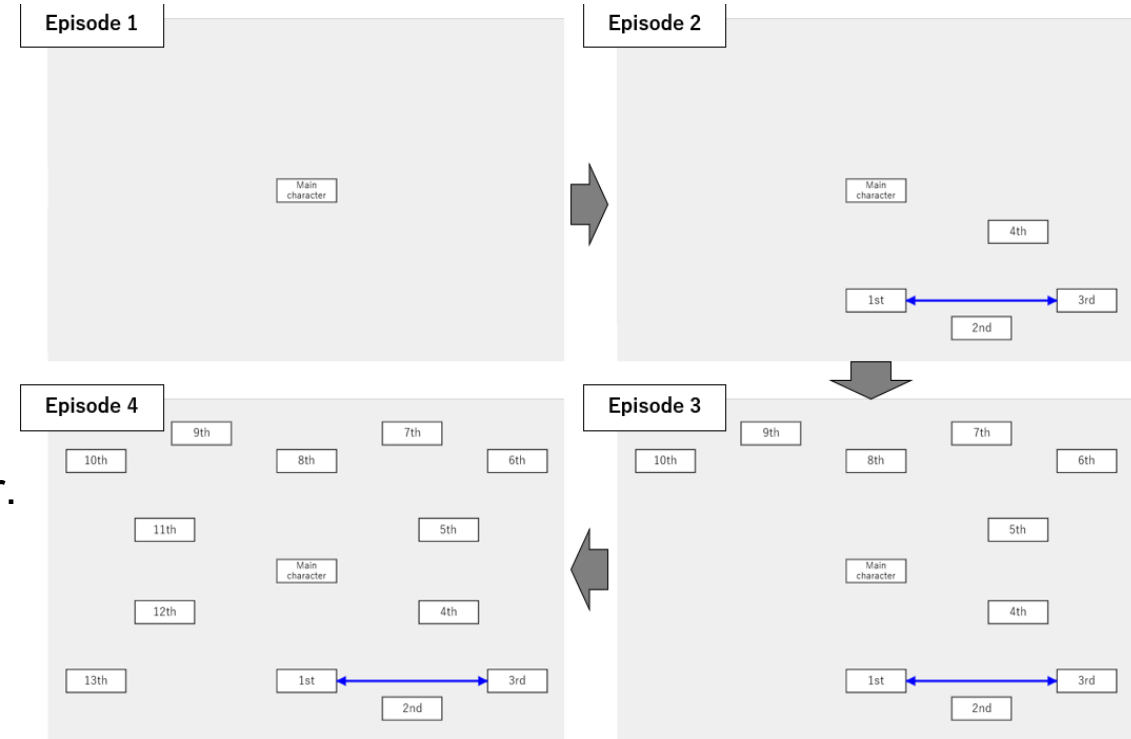
Neutral relationship: Cases where the above does not apply.¹⁰

Extraction of characters' relationships(3)



Arrangement of characters :

- The main character's cell is placed in the center.
- The interface links the cells by edges so that they do not overlap the cells.
- Characters other than the main character are assigned to cells by order of their entrance.



Highlighting new and changed characters' relationships :

- Adding a new label will highlight it compared to other characters' relationships.
- The users can see new characters' relationships from the label.

Output of the proposed interface

The screenshot displays a web interface for the novel "The Elegant Life of Royal Clerk Rit". At the top, the title is shown in a rounded rectangle, with a "HOME" link to its right. Below the title is a navigation bar with four buttons: "登場人物" (Characters), "登場人物の登場" (Character Appearances), "過去の登場" (Past Appearances), and "過去の登場の登場" (Past Appearances of Appearances). To the right of these buttons is a legend for relationship types: a blue double-headed arrow for "Positive relationship", a red double-headed arrow for "Negative relationship", and a green double-headed arrow for "Neutral relationship".

The main content area is divided into three columns, labeled "1", "2", and "3" at the bottom, representing different episodes. Each column contains a graph of characters and their relationships. The characters are represented by boxes (Rit, In, Rau, Sumika, Valthona, Touji) and ovals (Te, Lord Lute). Relationships are shown as arrows labeled "new".

Annotations on the screenshot include:

- An orange oval pointing to the title: "The title of the novel".
- An orange oval pointing to the legend: "Cell and Edge Description".
- An orange oval pointing to the graph in column 2: "Number of Episode".
- A blue arrow pointing from column 2 to column 3: "Horizontal scrolling".

Evaluation experiments (1)

The experimenter verified the effectiveness of the proposed interface to support remembering events of novel.

Experimental procedures :

experimental group

control group

Participants read three works in one day

After 3 days

After 3 days

The experimental group answer using the proposed interface.

The control group answer by relying on their memories without using anything.

The participants :

A total of 28 participants were asked to participate in the experiment, 14 were in the experimental group and 14 were in the control group.

Evaluation experiments(2)

Used novel texts :

- The experiment used two novels from each of the three genres of fantasy, romance, and mystery.
- They are posted on “Become a novelist”, a novel posting site.

Genre	Title	Character count	Episode
Fantasy	Re:ZERO -Starting Life in Another World	13,454	1~5
Fantasy	The Eminence in Shadow	12,037	1~5
Romance	The Most Heretical Last Boss Queen: From Villainess to Savior	11,216	1~5
Romance	The Fiancée Chosen by the Ring	15,555	1~5
Mystery	The Apothecary Diaries	21,151	1~5
Mystery	The Elegant Life of Royal Clerk Rit	18,260	1~5

Table : Genre and title of the novels used in the experiment

Evaluation experiments(3)

Used prepared quizzes:

- The experimenter created 72 quizzes.
- There were three types of quizzes used in the experiment, including the “**flow of the episode**”, “**characters’ relationships**”, and “**conversations between characters**”.

Evaluation method:

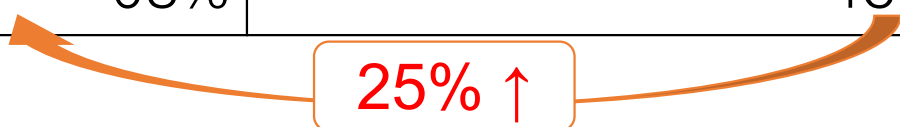
- The experimenter tested whether there was a difference in the mean of the two sample tests for **experimental group** and **control group**.
- The experimenter calculated the score of the answer data of the participants who took the quizzes.
- They were calculated using the point addition method.

Quiz example

Quiz type	quiz
flow of the episode	Why was the girl in a hurry as she crossed the alley?
	What did the girl do after Subaru collapsed?
characters' relationships	What were the goals of the three men he met in the alley?
	How did the girl who crossed the alley where Subaru was behave towards him?
conversations between characters	How did Subaru react when he saw the magic?
	What does the scenery of the other world look like from Subaru's perspective?

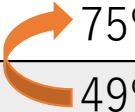

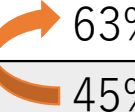
Experimental results: correct answer rate

	Experimental group	Control group
Answer rate	68%	43%



- Table shows the correct answer rates for Experimental and Control group.
- The correct answer rate was **0.68(Experimental group)** and **0.43(Control group)**.
- The authors think that participants were able to remember events more easily by viewing the characters' relationships and their changes visualized in the proposed interface about this result.

Experimental results : quiz type

	flow of the episode	characters' relationships	conversations between characters
Experimental group	26%↑  75%	30%↑  66%	18%↑  63%
Control group	49%	36%	45%

When comparing the difference in the average correct answer rates for each of the three types of questions, it was found that the order of easiest remember was **characters' relationships, flow of the episode, conversations between characters.**

Experimental results : genre type

	Fantasy	Romance	Mystery
Experimental group	65%	70%	70%
Control group	40%	53%	36%

↑ 25% (Fantasy), ↑ 17% (Romance), ↑ 34% (Mystery)

When comparing the difference in the average correct answer rates for each of the three types of genres, it was found that the order of easiest remember was **mystery**, **fantasy**, **romance**.

Conclusion

- This study proposed an interface that **visualizes characters' relationships** to support remembering events in the novel.
- The experimenter tested whether there was a difference in the mean of the two sample tests for experimental group and control group.
- The correct answer rate was **0.68(Experimental group)** and **0.43(Control group)**.
- Experimental results showed that the proposed interface could support the participants in remembering the events of the novel.

Thank you very much