

Designing Facilitator Assistant Functions to Support Intercultural Children’s Group Work

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Abstract

This paper proposes a design of a facilitator assistant aimed at supporting children speaking low-resource languages (LRL) in intercultural children's group work. Our previous studies have highlighted the challenges faced by LRL children in understanding conversations and expressing their ideas in such workshop settings. In response, our ongoing research focuses on exploring effective ways to provide support for LRL children. The design of the facilitator assistant function presented in this paper aims to address these challenges and enhance the participation of LRL children. By offering necessary assistance, we seek to create an inclusive and empowering environment that enables LRL children to effectively engage and contribute during the group activities. This paper provides a summary of our previous works and proposes facilitator assistant functionalities based on the findings of those studies.

Keywords

Facilitation, intercultural, children’s group work

1. Introduction

To address the complexities of global issues and foster international cooperation, it is crucial for Global Citizenship Education (GCED) programs aimed at children to embrace the diverse aspects of societies beyond mere language and cultural differences. In this context, machine translation emerges as a valuable tool that enables children to collaborate and engage in meaningful exchanges despite lacking a shared language. By leveraging machine translation within GCED initiatives, children can overcome language barriers and actively participate in cross-cultural collaboration, contributing to a deeper understanding and resolution of various international problems. However, cultural differences can still hinder effective collaboration. Furthermore, existing MT systems often struggle to provide accurate translations for low-resource languages (LRL), limiting the participation of LRL children in conversations [1]. In our previous workshops, it was observed that children who spoke low-resource languages (LRL) tended to participate less in conversations and exhibited a tendency to be more reserved.

In this paper, our objective is to summarize our previous works and discuss the functionalities of an automated facilitator assistant specifically designed to provide support to children speaking low-resource languages during group work within the context of problem-based learning based on our previous works. We aim to present a comprehensive overview of the proposed features and capabilities of the facilitator assistant, highlighting its potential in enhancing the engagement and learning experience of LRL children in collaborative problem-solving activities. By analyzing the specific needs and challenges faced by LRL

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children in group work scenarios, we aim to contribute to the development of effective tools and approaches that can facilitate their active participation and promote their educational outcomes.

2. Utterance Analysis

An extensive study was carried out previously, with the specific objective of formulating a comprehensive design for an automated system that would effectively aid in facilitating group work.

In our previous study [2], we investigated the role of facilitators in a real-world intercultural children's workshop by analyzing conversation log data. The workshop was an annual workshop called KISSY (Kyoto International Summer School for Youth) organized by non-profit organization (NPO) Pangaea, where children from diverse countries come together to participate in group activities. Each intercultural team in the workshop is assigned an adult facilitator to provide support.



Figure 1: Children communicating in groups using machine translation (Photo courtesy of NPO Pangaea)

The analysis focuses on the correlation between facilitator utterances and children's responses in adjacency pairing. Through annotation and statistical analysis of the tagged data, it is found that certain types of facilitator messages have a significant influence on the engagement of children speaking low-resource languages.

By analyzing the facilitator's utterances based on Sarle's [3] and comparing them with the children's responses, it was found that the type of instruction from the facilitator significantly influenced the response rates of low-resource language children. Specifically, "request" utterances were found to increase their response rates, while "tell" utterances tended to inhibit their responses. Repeating "request" utterances also proved effective in promoting responses. However, further validation is needed to ensure the consistency of the tag set used and to conduct controlled experiments with larger log data. Nonetheless, the findings contribute to the development of a facilitation manual for children's workshops and the potential creation of a facilitator agent to enhance the active participation of low-resource language speaking children in multilingual communication.

3. Virtual Facilitation Agent

In addition, another significant research endeavor focused on introducing a concept: the virtual facilitation agent [4]. This concept entailed the development of an automated agent

capable of actively engaging with team members by posing questions and providing responsive support during discussions. To evaluate the effectiveness of various facilitation strategies within discussion groups, a series of experiments were meticulously carried out using our state-of-the-art multilingual chat system. These experiments aimed to analyze the impact of different approaches on enhancing collaborative interactions and ensuring a fruitful exchange of ideas among team members, irrespective of their linguistic backgrounds. Our research encompassed the identification and definition of four distinct strategies for the facilitator agent, drawing upon existing studies in the field[5][6]. To enhance the comprehension of low-resource language speakers, we devised two types of utterances: one aimed at requesting a summary of the ongoing discussion, and the other focused on soliciting a paraphrase. Additionally, in order to encourage the active participation of low-resource language speakers, we developed two types of responses that provided positive reinforcement and neutral response for the opinions they expressed.

Table 1
Utterances strategy designed to support LRL Speakers.

<i>Strategy</i>	<i>Purpose for LRL Speakers</i>	<i>Condition</i>
Request for a summary	Promoting Understanding	No utterance from LRL speakers for a period of time
Request to rephrase	Promoting Understanding	Utterance from HRL speakers longer than a certain number of words
Respond to LRL utterance	Promoting Utterance	Response to LRL speaker utterance (i.e. I see, uh-huh)
Positive response to LRL utterance	Promoting Utterance	Response to LRL speaker opinion utterance (i.e. Good idea, I like it)

The outcomes of an experimental study revealed a statistically significant effect, with a significance level of 5%, in the subjective evaluation regarding whether the facilitator's communication elicited additional utterances. The strategies that trigger new utterances from LRL speakers are request for a summary, response to the utterance from LRL speaker and response positively to the utterances from LRL speakers.

4. Facilitator Assistant Agent

4.1. Role of the Agent

In our previous work, we introduced a virtual facilitation agent. However, in real-world workshop settings, human facilitators play a crucial role in leading conversations and activities. Therefore, our proposal aims to introduce an assistant that complements rather than replaces the facilitator, with a specific focus on supporting conversations involving children speaking low-resource languages (LRL).

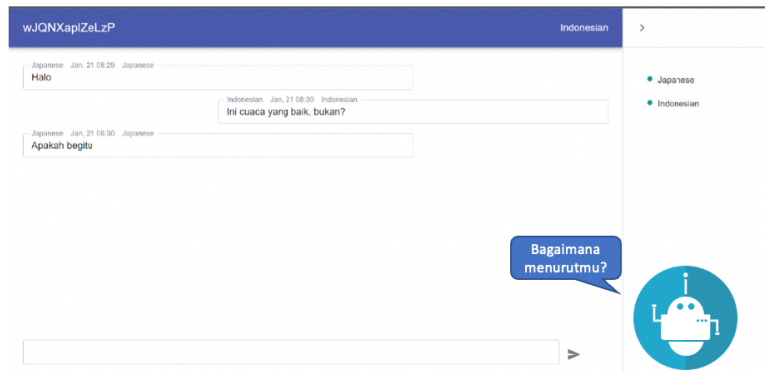


Figure 2: Facilitator assistant agent in our multilingual chat system supporting Indonesian language speaker.

Currently, this agent can be utilized within a multilingual chat system. However, there is potential for further development, envisioning a physical agent that can respond to voice commands in the future.

4.2. Proposed Functions of the Agent

The functionalities of this assistant have been designed based on our previous research efforts.

4.2.1. Sending Request Utterance to LRL User

Based on the research mentioned in section 2, it has been observed that children tend to respond more positively to soft directive utterances or requests. In contrast, when facilitators use "tell" utterances, the response rate tends to decrease. Building upon this finding, we propose that the assistant agent should be programmed convert "tell" utterances into "request" utterances before delivering them to children who speak low-resource languages (LRL).

For instance, an utterance such as "Tell me your ideas" can be transformed into "Please share your idea" or "Do you have any idea?" by employing indirect requests. By adopting this approach, we aim to enhance the likelihood of receiving responses and encouraging active participation from LRL children.

4.2.2. Asking for Conversation Summary

Based on the research discussed in section 3, it has been found that asking for a summary from the group, including both LRL (low-resource language) and HRL (high-resource language) children, encourages children to engage in the conversation. This approach proves beneficial for LRL children to catch up with the ongoing discussion. However, the appropriate timing for implementing this strategy is not yet clear, as asking for summaries too frequently may not be ideal.

One potential method to address this issue is to periodically check with LRL children if they are following the conversation when they haven't sent a message for a certain period of time. Another approach could involve employing physical-based detection mechanisms, such as eye tracking or facial emotion recognition systems, to identify any child who may be experiencing difficulty in understanding the ongoing conversation.

Upon detecting signs of difficulties, the agent can then prompt the group to provide a summary, ensuring that LRL children have the opportunity to comprehend and actively participate in the discussion. By utilizing these methods, we aim to strike a balance between facilitating LRL children's understanding and avoiding excessive reliance on summary requests.

4.2.3. Response to LRL Children

Similar to the proposal for the facilitator agent, it has been observed that responding neutrally and positively to LRL children tends to be effective. Instead of relying solely on the facilitator agent, we suggest that the assistant agent should adopt this strategy. In previous research, the facilitator agent sent response messages to the chat room for all utterances by LRL speakers.

To implement this strategy, we propose utilizing a language model such as BERT (Bidirectional Encoder Representations from Transformers) to identify whether a message expresses an idea or not. By applying BERT or a similar model, the assistant agent can determine if an utterance from an LRL child is indeed an idea.

When the agent identifies an idea from an LRL child, it should respond with an appropriate automated message. This response could be neutral, for example, "I see," or positive, such as "That is a good idea!" This approach aims to encourage and validate the contributions of LRL children within the conversation.

By leveraging the capabilities of language models like BERT, the assistant agent can effectively identify idea expressions from LRL children and provide suitable automated responses that contribute to a supportive and inclusive environment.

5. Discussion and Future Work

In the context of discussion and future work, although this work initially aimed to support children speaking low-resource languages (LRL), it is evident that the strategies proposed can be beneficial for all children, as some may struggle to participate irrespective of their language proficiency. In our future implementation, we intend to extend these strategies to encompass all children in the group, aiming to enhance their engagement and inclusion. To facilitate this, we are interested in exploring the use of technologies such as facial expression detectors to identify children who may be experiencing difficulties and require assistance from the assistant agent.

Furthermore, an important consideration is whether the agent should privately send messages to individual children or send them to the chat room for all participants to see. To determine the most effective approach, we plan to conduct experiments in both situations, evaluating the impact on children's engagement and participation.

As this paper primarily presents a design proposal, our next steps involve implementing these functionalities within our multilingual chat system. Additionally, we aim to further develop this proposal by creating a physical agent (robots) that can be utilized in face-to-face conversations. By combining technology with real-world interactions, we anticipate providing comprehensive support for children in intercultural group work settings in the future.

6. Conclusion

In conclusion, this paper has proposed the design of a facilitator assistant function aimed at supporting children speaking low-resource languages (LRL) in intercultural children's

group work. Through our previous studies, we have identified the challenges faced by LRL children in understanding conversations and expressing their ideas in workshop settings. To address these challenges and enhance the participation of LRL children, we have presented an overview of the facilitator assistant functionalities. By offering necessary assistance, we aim to create an inclusive and empowering environment that enables LRL children to effectively engage and contribute during group activities. The proposed functionalities, including converting "tell" utterances to "request" utterances, asking for conversation summaries, and responding to LRL children's ideas, are based on the findings of our research.

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