Flip-J: development of the system for flipped jigsaw supported language learning

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Abstract. This study aims to develop and evaluate a language learning system supported by the 'flipped jigsaw' technique, called 'Flip-J'. This system mainly consists of three functions: (1) the creation of a learning material database, (2) allocation of learning materials, and (3) formation of an expert and jigsaw group. Flip-J was developed as the plugin of the learning management system Moodle, and the formative evaluation for its improvement was conducted in a language learning class. Learners were required to answer an open-ended questionnaire on the usability of Flip-J after three weeks of flipped jigsaw classes, and the instructor was interviewed by the researcher. The results highlighted several areas for improvement, such as 'unfriendly interface of discussion plugin' and 'translation function', which will be incorporated in forthcoming classes. The instructor pointed out issues such as the learners seemed to face difficulties in using the discussion plugin and role management in Flip-J.

Keywords: flipped learning, jigsaw method, open educational resources, instructional design.

1. Introduction

The flipped class has gained international attention as an effective method of language teaching; it uses a blended learning design with online learning materials to enhance learning engagement in face-to-face classes (Sams & Bergmann,

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How to cite this article: Yamada, M., Goda, Y., Hata, K., Matsukawa, H., Yasunami, S. (2016). Flip-J: development of the system for flipped jigsaw supported language learning . In S. Papadima-Sophocleous, L. Bradley & S. Thouësny (Eds), *CALL communities and culture – short papers from EUROCALL 2016* (pp. 490-495). Research-publishing.net. https://doi.org/10.14705/rpnet.2016.eurocall2016.612

2013). It has been employed in English as a Foreign Language (EFL) learning with positive results (e.g. Engin, 2014; Fraga & Harmon, 2015). In language learning, it is desirable that instructors and learners acquire the necessary knowledge and vocabulary prior to face-to-face classes. However, several issues with the implementation of flipped classes have been pointed out. For example, learners do not watch the required video prior to the class (Sams & Bergmann, 2013). Therefore, a flipped class design that enhances learning engagement should be considered for effective and efficient face-to-face classes.

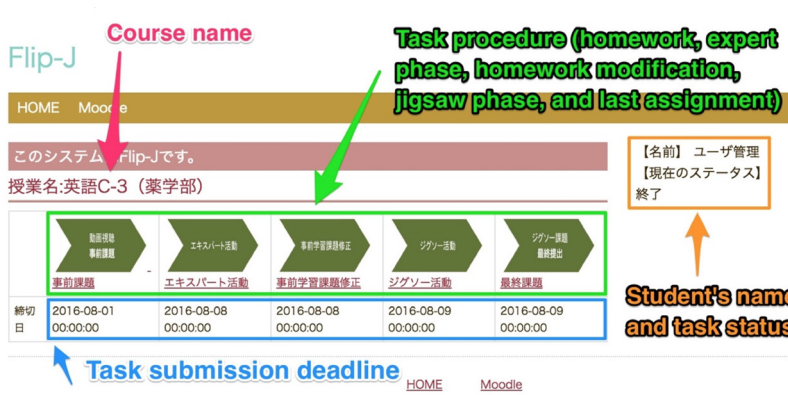
The jigsaw collaborative learning approach can be one of effective instructional approach for the enhancement of learning responsibility and interaction. The jigsaw collaborative learning approach consists of two phases; expert and jigsaw phases. First, the discussion topic was presented to students. For expert phase, students are divided into several groups, with each group assigned a different perspective of critical points of the discussion. Students usually study the material individually. Therefore, students confirm their understanding of each other, and discuss the theme in order to deepen their idea as 'experts' of the theme. After the expert phase, they move to the jigsaw phase. Students discuss the theme with different members of the expert group. They first introduce the contents that they studied, and discuss the topic. After the jigsaw phase, they are required to share their idea with all classmates. When the jigsaw collaborative learning approach was used to encourage quality interactions and promote higher-order thinking to improve the students' learning engagement, positive effects on learning were reported in different subjects, from elementary to graduate school (Aronson & Patnoe, 2011). This is a helpful method for EFL students who lack confidence in speaking in English; this method helps them develop enough confidence to discuss their assigned expert topic with a jigsaw group and speak in English successfully. In this study, the flipped class and jigsaw approaches were merged to create the flipped jigsaw collaborative learning approach (or 'flipped jigsaw').

Goda et al. (2015) reported on the practice of employing flipped jigsaw activities in EFL education. The results showed that many students found the study for English practice taxing with this learning approach, although their expectations of their English skill improving were also high in general. However, preparing for this approach seems to take a lot of time and instructors feel that the workload, which includes preparing for group formation and re-formation in case the learners are absent and/or do not submit their homework, is high. This study aims to develop a language learning support system called Flip-J that supports the flipped jigsaw class design, and to evaluate its usability in language learning classes.

2. System functions

The system is a web-based application that uses the plugin for the learning management system Moodle. Flip-J has three functions: creation of a learning material DataBase (DB), allocation of learning materials, and formation of an expert and jigsaw group. First, using the learning material DB, instructors can register information (URL, starting time, description, and metadata) on open educational resources such as YouTube and Voice of America videos that are free to use for teaching. They can reuse and share these learning materials with other instructors. Second, under allocation of learning materials, instructors can set the homework as an expert group activity. The instructor sets the number of expert groups (topic) and team members in each expert group. If the instructor sets three expert groups and there are four team members in each group, the instructor has to prepare for three types of learning materials in the DB. The instructor provides information about the homework using the learning material DB. Thirdly, in the formation of an expert and jigsaw group, students are automatically assigned to expert and jigsaw groups for both virtual and face-to-face classes, based on their homework for the expert group activity submitted to Flip-J and the number of members set by the instructor. The instructors can change the members assigned to a group even after the automatic group formation. When an instructor finds that students are absent or identifies students who do not complete their homework, he/she can modify the group by using the drag-and-drop function on the user-friendly interface. Students who did not finish homework are required to study their homework for expert phase, because they cannot explain their ideas, and contribute to expert and jigsaw discussion without the accomplishment of their homework. Sample interfaces are shown in Figure 1.

Figure 1. Interface of Flip-J: learning process and task submission deadline



3. Methods

94 university students (female: 7, male: 87; all students were in the second year, and belonged to the School of Engineering) and one professor participated in the formative evaluation. The instructor designed the class for language learning using Flip-J. After the classes were over, students were required to answer the open-ended questionnaire on the usability of Flip-J, and researchers interviewed the instructor in order to identify areas for improvement.

The design and implementation of the flipped jigsaw approach followed the study by Goda et al. (2015). Three in-class and two out-of-class activities were embedded in the design for three weeks. In the first week, students received instructions regarding the procedure and the purpose of the activities. One of the three video clips was randomly assigned to each student, and the students would then act as experts on the content assigned to them. The students were required to submit Assignment 1, wherein they answered four open-ended questions regarding the video, through Flip-J.

Assignments were due the day before the next class. This forced each student to prepare for the expert discussion – and, further, for the jigsaw discussion – during the next class session. The discussion topic in the jigsaw group was as follows: 'What skills, knowledge, and attitudes should be acquired in the 21st century? How can we effectively and efficiently learn new things in our modern society? Compare and contrast the traditional and new education methods'. The video clips had been selected by the instructor from open educational resources such as YouTube. These videos showed content pertinent to the jigsaw discussion.

In an expert group discussion, three to four students who watched the same video were assembled, and confirmed their understanding of the video content for 20 minutes with each other.

Following this, students were asked to revise their answers in Assignment 1. Then, three students from different expert groups were organized into jigsaw groups. The students in the jigsaw groups were instructed to share their findings and understanding of the assigned video content and were asked to discuss the topic for 40 minutes. They were then instructed to submit Assignment 2, a report of the topic in third class, via Flip-J by the next class session. During the class in the third week, reports submitted as Assignment 2 were peer reviewed, and the students presented their thoughts on the topic to the class.

4. Results

31 out of 94 students answered the questionnaire about Flip-J after the third class. They understood the flow of the learning activity and completed the tasks via Flip-J. Above all, learners recognized that the Flip-J interface was highly accessible (ten learners) and user-friendly overall (six learners). 15 learners answered that they enjoyed communicating with acquaintances. The learners identified several areas for improvement to this system: (1) feature to adjust speech speed on embedded movie players (seven learners), (2) the function of the caption translation into native language (three learners), and (3) the interface of a discussion plugin, which was installed as a default Moodle plugin (19 learners). The instructor also suggested improvements in function: adding role management, which allows instructors to check the learning materials assigned to learners, and improving a discussion forum that was installed as a Moodle plugin and which the learners found difficult to use. In the latter, the learners could see the discussion forum of all groups, but had to reload the forum board when other learners posted.

5. Conclusions

In this study, we developed a language learning system supported by the flipped jigsaw technique, called Flip-J. We also conducted a formative evaluation of the technique using an open-ended questionnaire and an interview with the instructor. The results of the formative evaluation indicated that Flip-J can support learning behaviors in language learning, but has several areas for improvement, such as discussion forum and role management. We will improve the functions identified in this formative evaluation and re-evaluate the effects of this system from the viewpoint of the learning community (Yamada & Goda, 2012).

6. Acknowledgements

This research is supported by Grant-in-Aid for Scientific Research (B) No. JP26280120 from the Japan Society for the Promotion of Science.

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Published by Research-publishing.net, not-for-profit association
Dublin, Ireland; Voillans, France, info@research-publishing.net

CALL communities and culture – short papers from EUROCALL 2016
Edited by Salomi Papadima-Sophocleous, Linda Bradley, and Sylvie Thouësny

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Legal deposit, United Kingdom: The British Library.
British Library Cataloguing-in-Publication Data.
A cataloguing record for this book is available from the British Library.

Legal deposit, France: Bibliothèque Nationale de France - Dépôt légal: décembre 2016.