

An Empirical Study to Promote Deep Learning by Improving Reading Circles Learning through ICTs

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Abstract: This research was intended to explore the possibility of using ICTs to promote deep learning by improving the design of Reading Circles Learning(RCL) to flipped learning, called Flipped Reading(FR). FR is designed to use ICTs in pre-learning and has been conducted 4 times in university. The first, second and third practice were conducted in a small class by graduate students, the fourth was conducted in large classes by undergraduate students, and audio presentations were adopted except for the first time. In order to clarify the relationship with deep learning, objective tests, questionnaires etc. were carried out, and the results were analyzed from the viewpoint of internalization and externalization. Based on the results of the four practices, it is necessary to encourage ICT utilization not only to provide learning materials but also to deepen understanding(internalization) as a tool of self-study and reflection in pre-learning for RCL, by incorporating multiple internalization and externalization activities into pre-learning.

Keywords: ICTs, Reading Circles Learning, Deep learning, Internalization, Externalization

INODUTRCTION

In higher education, Information and Communication Technologies (ICTs) are used to improve the quality of learning, especially flipped learning or flipped classroom. It is very common that in flipped learning (FL), students watch online lectures, or carry out research at home while engaging in the utilization of the knowledge in the classroom, and FL is possible to realize deep learning.

In order to realize deep learning, Matsushita (2015) explained internalization as "acquiring necessary knowledge", externalization as "attempting to resolve conflicts by actually applying the knowledge", and pointed out " Once internalized knowledge is reconstructed through externalization activities such as using it, talking to people and writing for problem solving, , it can promote deeper understanding (deepening of internalization) ".

Regarding FL, Miho et al. (2016) pointed out that "the way of pre-learning for deepening understanding plays an important role in making active learning in the classroom ". It is necessary to explore the how to use ICTs to promote understanding in pre-learning.

Hu & Nonaka (2017a) improved Reading Circles Learning(RCL) from the viewpoint of internalization and externalization by adopting FL(Practice 1). However, it is also clear that the effect of video lectures for preview varies depending on students'

personal differences such as subjectivity, so it is necessary to rethink how to use ICTs.

Hu & Nonaka (2017b) adopted the audio presentations based on the summary for pre-learning in RCL instead of the video (Practice 2), called Flipped Reading(FR). As a result, pre-learning had increased, and recording the audio had led students to realize the problems of relevance and logicity of knowledge. However, the influence of audio presentations on understanding has not been clarified.

Therefore, this research is intended to clarify the influence of adopting audio presentations in RCL on understanding and explore the possibility of promoting deep learning by using ICTs based on the viewpoint of internalization and externalization. RCL can be divided into responsible part and non-responsible part. In the responsible part, students record the audio, while in non-responsible part, students just listen to the audio. In order to examine the effect of these two different activities, Practice 3 and 4 were conducted following Practice 1 and 2.

REARCH DESICH AND METHODS

Practice 3

The possibility to deepen understanding has been examined in practice 2, practice 3 was carried out to verify its effect for a relatively long period. Practice 3 was conducted at Y University in the "Lesson Design Exercise I" in 2017, and the participants were 7

graduate students. The first half of the 15 classes was carried out in the same way as practice 2, and from the second half the white board was adopted at the beginning of the class. The survey was also the same as practice 2.

Practice 4

In order to examine the effect of the activity of listening to audio, FR was designed in Large Classes Practice 4 was carried out in "School Education Front Line" of Y University in 2017. It was an omnibus type lesson with more than 300 undergraduate students, and this practice was conducted in the last lesson. Before the last lesson, the schedule of the last lesson and handouts were distributed, and the summary and its audio were provided for out-of-class learning through university's learning management system. In the class, the effect was examined by the objective test. The objective test included gap filling, true/false judgment, explanation of contents, and questionnaire was carried out to investigate learning time etc.

RESULTS

Practice 3

For the responsible part, the average (*SD*) of the learning time for face-to-face RCL (FTFR) is 2.17 (0.18) and FR is 2.53(0.32). For the Non-responsible part, FTFR is 0.87 (0.18) and FR is 1.11 (0.22). There was no significant difference in the responsible part (*n.s.*), whereas the non-responsible part showed a significant trend ($t(6)=-2.29, p<.1$). In the non-responsible parts, an increase in pre-learning was reconfirmed, the same as Practice 2.

Then, regarding "recording the audio", student T pointed out that "the act of reading became an opportunity to reflect and understanding advanced." Regarding "listening to the audio", student N says, "Since you can judge whether your understanding is sufficient by whether you can listen to the audio without a problem or not. When you need to unwind the audio, you don't understand."

Practice 4

The students were divided into high group and low group according to how much time they spent on handouts-reading and summary-reading, and audio-listening group and no-audio group according to whether they had listened to the audio or not. Variance analysis was used to examine the relationship between learning time and the scores of the objective test, we found that as for the score of explanation of contents, which requiring deeper understanding, in the audio-listening group, students who in the summary-reading high group scored higher than the low group ($F(1,254)=4.19, p<.05$). And when listening to the audio, students who both carried out

the temporary stop or rewinding of the audio and rereading the summary scored higher in the explanation of the contents ($F(2,178)=3.91, p<.05$). And students who both carried out the rehearing of the audio and rereading the summary ($F(2,177)=5.11, p<.01$) scored higher in the explanation of the contents. With the analysis of free descriptions, it was suggested that providing both written and audio materials have the possibility to encourage understanding.

CONCLUSION

Based on the results of 4 practices, Figure 1 was drawn to show the transformation made by audio presentations compared to FLFR. In the responsible part, FTFR only involves self-reading (internalization) and writing a summary (externalization), but by recording the audio (externalization), rereading of the book and summary (internalization) was promoted in FR. In the non-responsible part, FTFR involves self-reading (internalization) only, but rereading of the book and summary (internalization) was promoted by listening to the audio (internalization) in FR. Therefore, it is necessary to encourage ICT utilization not only to provide learning materials but also to deepen understanding (internalization) as a tool of self-study and reflection in pre-learning for RCL, by incorporating multiple internalization and externalization activities into pre-learning.

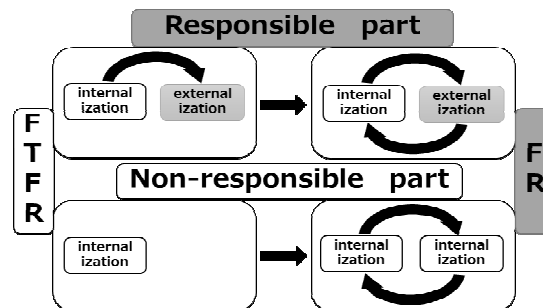


Figure 1

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