

Group Work and Role Rotation using a Learning Management System in a Japanese Computer Science University

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Abstract

A learning management system (LMS) was implemented in six second-year technical reading classes in a Japanese computer science university. The LMS was used to organise and manage small groups of students. The small group structure and role rotation was intended to recreate a learning context familiar to Japanese students from previous public education. Thus we attempted to implement an LMS consistent with cultural learning practices. The function of the LMS and difficulties with the software are described. Recognition of the cultural learning practices in the design and implementation of learning management systems is intended to meet student needs and improve usability.

1. Introduction

Group work is considered to be an important aspect of communicative language teaching [1] and understanding the specific Japanese approach to group work can help to design strategies for using learning management systems for university students. A learning management system (LMS) was implemented to build and support group work strategies similar to those that Japanese university students are familiar with from their prior public school education.

Japanese public education has a long tradition of group work. However, transient-grouping strategies for single class activities in communicative language teaching (CLT) are quite different from the continuous-grouping strategies found in Japanese schools. Our view was that university reading courses, in which group work is used as a CLT strategy, might benefit from recognition of the group practices followed in Japanese schools. In addition, learning management systems (LMS) can be used to support group work as a communicative language teaching strategy. However, there is little guidance in the applied linguistics or CALL literatures on how this might be done.

Our action research project examined the use of an LMS in six second-year technical reading classes in a Japanese university. There were approximately 180 male and 30 female students who were all about 19 or 20 years old. The university specialises in computer science and all students have a thesis-writing requirement for graduation. Japanese learning and teaching practices in public school education ultimately influence how students learn in university [2]. We used an LMS to support and expand on group learning practices with which Japanese students are familiar.

We carried out the following steps in implementing group work supported by an LMS. We identified the characteristics of Japanese group work in the public education system. Next, we selected a group work system used to teach university engineering classes in the USA, but which emphasises continuous cooperative and collaborative group work. In addition, we implemented these structures in Moodle, a popular open source LMS. This implementation of Moodle was done to support the enhanced group work structures both in and outside class. This fusion of ideas was not without problems; we identified areas where the software could be improved to accommodate group workflow and evaluation.

2. Background

Until recently, the research literature on CALL tended to focus on the individual aspects of language learning, even if the technology promoted communication within and among groups of students. Social and cultural aspects of CALL were not widely discussed in the literature. As learning management systems (LMS) have become more widely used, considerations of the social, cultural, and institutional learning contexts have become more prevalent [3] [4]. Education designed to accommodate the cultural context is more likely to benefit students [5] [6]. Accommodating cultural learning practices has become possible now that new designs in LMSs allow for

innovative social groupings and workflow that were not possible with earlier software.

Using Moodle, we created a learning environment in which students were assigned separate roles to engage in the same reading.

2.1. Communicative language teaching

Foreign teachers of English usually organise Japanese students for group work in ways that do not match student expectations about group formation established over many years of public education. When Japanese children are in pre-school, elementary, and junior high school, their teachers organise them into groups for both non-academic and academic tasks. These groups are multi-purpose and continue for extended periods of time. Such prior experience working in permanent groups is quite different to features of group work familiar to foreign teachers who have been trained in English as Foreign Language (EFL) programs to teach communicatively where the emphasis tends to be on transient group strategies for individual class sessions.

2.2 The Japanese education system

Japanese students' classroom behaviors reflect their cultural beliefs and their social expectations. From kindergarten through high school, teachers assign Japanese children into small mixed-ability groups called *han*. The children not only work in their han during teacher assigned times, but they also work as a group on many shared common tasks. These groups play together, work together, eat together, and learn together.

The leaders of the han are referred to as *hancho* and are responsible for acting as a teacher's apprentice and reporting the han's status to the class. Other forms of student leaders are the *toban*, or the class leaders responsible for mediating problems among the students, and the "teaching children" called *oshiigo* [7]. One result of using student groups and leaders is that children are taught to regulate their own social harmony on a small scale, as they must maintain peace among their peers in the han. This is the model of classroom behavior and expectations that students bring to the university classroom.

Our examination of the literature identified a collaborative learning strategy that has been designed to help teachers manage the complexity of carrying out small group projects in large engineering classes [8]. The following section examines some of the salient characteristics of the collaborative learning strategy,

described by Oakley et al. [8], that was implemented in six technical reading classes.

2.3. Structured learning roles

Oakley et al. [8] have described elaborate strategies for coordinating and evaluating large engineering classes. We modified their group strategies and adapted a simplified version to our technical reading classes. In part, these strategies involve organising students into groups of four. In their system, students choose their groups and within the group each student selects one of four separate task roles, for example, coordinator, recorder, checker, and group process monitor. These roles are intended to manage the group and to keep it functioning. The coordinator is responsible for scheduling and organising meetings, and for making sure that the other team members know their responsibilities and deadlines. The recorder is required to take notes and prepare any written documentation. The checker verifies the correctness of the final product and submits it. The group process monitor verifies that each team member understands what to do to accomplish the final product. This role includes not just verify that the purpose of all the roles is understood, but also verifying the process of creating a final product. Taking on different roles enables students to attempt smaller aspects of an overall task and to internalise specific subgoals of an overall activity [9]. In addition to their group function roles, all students are responsible for content.

3. Group work in technical reading

According to Grabe [10], there are 10 fundamental attributes that need to be addressed to improve the reading comprehension of second-language learners. Since remaining current with the computer science literature is a life-long task, we considered these attributes to be fundamental to our students' professional careers. To benefit student readers, Grabe suggests that teachers:

1. ensure word recognition fluency,
2. emphasize vocabulary learning and create a vocabulary-rich environment,
3. activate background knowledge in appropriate ways,
4. ensure effective language knowledge and general comprehension skills,
5. teach text structures and discourse organization,
6. promote the strategic reader rather than teach individual strategies,
7. build reading fluency and rate,
8. promote extensive reading,
9. develop intrinsic motivation for reading, and
10. plan a coherent curriculum for student learning. [10]

Using this list of instructional goals as a guide, in-class reading strategy lectures and activities were developed as a basis for diversifying the students' approach to second-language reading. The textbook selected for this course was related to the field of computer science and engineering, and therefore, the reading course content, while simpler, was directly relevant to the students' content-area studies.

We organised each of six classes of students into groups of four, which remained together throughout the semester. Each week there were four related readings taken from *How networks work* [11]. Student group work consisted of two tasks, a cooperative task, and a collaborative task. The cooperative task prepared students for the collaborative task and involved four separate activity roles; both tasks were based on the same reading. The collaborative task consisted of a whole group effort to construct a concept map [12] using open source software known as CmapTools [13]. The cooperative and collaborative roles were designed in reference to Grabe's (2004) guidelines.

3.1. Cooperative task

For the cooperative task, we modified the Oakley et al. [8] roles to match the learning objectives of the second year technical reading course. Each member of the group was assigned a reading role for the weekly reading text. All group members completed these roles according to a rotating schedule whereby each student fulfilled each role before returning to the starting role.

The four basic reading roles for the cooperative group task were the following: Main Ideas Seeker, Vocabulary Builder, Collocations Finder and Bibliographer. Each of these roles is described below:

- a) The **Main Ideas Seeker** was responsible for reading the weekly text and using their skimming/scanning skills to identify the theme and the main ideas of the text. Their understanding of text structure and general reading comprehension skills were also employed to complete this task. The Main Ideas Seeker was also responsible for recording the main ideas in a searchable public glossary within the LMS.
- b) The **Bibliographer** role was designed to extend student reading beyond the text content and the text's structural and discursive features. After reading the weekly reading text, this role required students to use library and web-based search engines to research scholarly articles and books that directly related to this topic. For each selected text, the students added

its reference, and a brief overview of its content, to a searchable glossary in the LMS. This extensive reading activity provided a vocabulary-rich environment in which students could read other authentic texts on the same, or a related, topic.

- c) The **Vocabulary Builder** focussed on word recognition and vocabulary development. Unfamiliar words were gleaned from the weekly reading text and written in a glossary of the LMS along with their definitions. This public glossary was searchable by all students, regardless of their designated class.
- d) The role of the **Collocations Finder** was to use online concordancing tools to seek out the usage of unfamiliar words in the weekly reading text. Example sentences of these words in use were entered into a searchable glossary. This activity aimed to raise the student's awareness of the vocabulary items in context, and the words most commonly collocated with these vocabulary items.

These roles also aimed to encourage the reading and use of texts for multiple purposes. Firstly, the students read the text individually. Secondly, they performed their cooperative-group reading role, and posted their responses to the LMS.

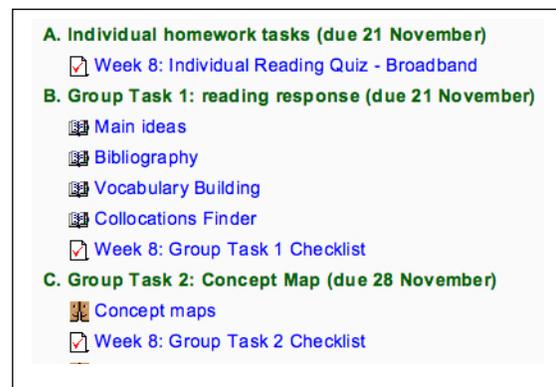


Figure 1 - Assignment posting in Moodle

3.2. Collaborative task

Having performed their cooperative role, the students then came together to carry out a collaborative task based on the same weekly reading text. The collaborative task consisted of making a concept map based on the same reading as the cooperative task. This assignment was due one week after the cooperative assignments were due and class time was provided to make the map. Concept maps are a type of visual organiser that is used in EFL instruction and particularly in reading [12]. An example of small concept map produced by a student group is displayed in Figure 2.

Making concept maps collaboratively provided students with a third pass through the same text with a third purpose. Multiple encounters with the same text provide

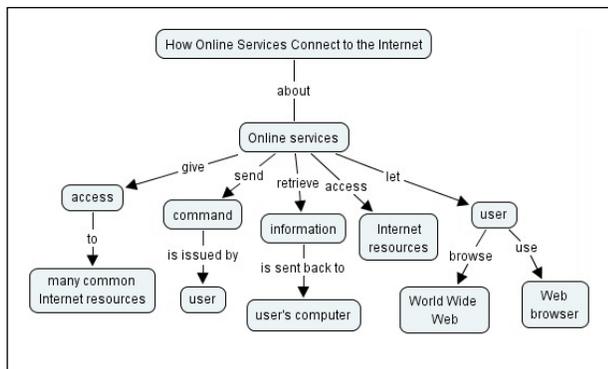


Figure 2 – Concept map

students with different ways of encountering the text, thus giving them more time to analyse the same text and its structure, but these multiple passes through the text also provided them with more opportunities to encounter the same vocabulary items.

4. Evaluation

In our six classes, students responded positively to group. They tended to like working with the same group and felt that the group’s tasks helped their reading as can be seen in Tables 1 and 2.

Table 1 – Like group work by Like same group
Like working with same group members

	SA	A	N	D	SD	Totals
SA	12	4	2	0	0	18
A	11	32	20	3	0	66
N	3	26	43	10	0	82
D	0	5	15	8	3	31
SD	1	1	1	3	3	9
Totals	27	68	81	24	6	206

SA = Strongly Agree; A = Agree; N = Neutral;
D = Disagree; SD = Strongly Disagree.

Table 2 – Tasks help reading by Like same group
Like working with same group members

	SA	A	N	D	SD	Totals
SA	8	9	3	0	0	20
A	16	37	41	9	1	104
N	2	17	30	10	2	61
D	1	5	7	4	2	19
SD	0	0	0	1	1	2
Totals	27	68	81	24	6	206

4.1. Issues with group work support

The group formation and role assignment phase of our study was not problematic. Groups sat together in class, and were also assigned to a corresponding group in Moodle that was visible to all other students. Most students understood the requirements of the reading assignment and the corresponding cooperative roles and collaborative concept map activity. However, we had difficulty constructing an LMS environment that completely matched our groups and roles. In Moodle, it is impossible to have students belong to different groups at the same time. So, for example, in order to provide specialised role training, if we had wanted to create a separate forum and limit access to all of the bibliographers or main ideas seekers, this would not have been possible. Membership in multiple groups is not currently possible. However, this may change in version 1.6.

4.2. Issues with evaluation of group work

Even though groups are available in Moodle, postings to forums must be individual, so that the corresponding evaluation is also individual. It is possible for one member to post on behalf of a group, but in large classes it is difficult to determine whether all groups have posted. Furthermore, only the individual who posts has an evaluation registered and displayed in Moodle, but not the other members of the group. This applies to all group work posted by a single individual. If students forget or do not understand that everyone needs to post the same work, they will not be graded. Our solution was to have work posted separately and then have students complete a weekly checklist for each group task so that they would receive a completion grade for their work. There is no way to post as a group and receive an individual grade.

In addition, there is no way to allocate a grade proportional to the individual contribution to the group. Oakley et al. [8] recommend collecting peer ratings of team member participation. These ratings are used to calculate individual weighting factors, which are then applied to the grades assigned to the team to determine individual grades for each student. This procedure is intended to improve equal participation of the team members by allocating grades proportionate to individual contribution. While posting a co-constructed concept map to a forum is possible, there is no corresponding evaluation tool to allocate grades based on individual participation as determined by group evaluation of members’ contributions. As a result, individuals who do not contribute to the group cannot be easily identified.

We frequently had to refer to individual student’s activity reports in Moodle to verify whether the reading role work

had been posted and if so, whether or not the checklist had also been completed. In some cases, students had not done the work, but indicated in the checklist that they had. In other cases, students had completed the work, but had not completed the checklist necessary to receive a grade. Most of the time though, role and checklist completion were the same.

4.3. Issues with workflow

In order to support project-based group work, it would be helpful if workflows could be created where successive activities are contingent on the completion of prior activities by members of the same, or other, group. A workflow function would have to include tools for displaying and evaluating a group portfolio of work, along with tools for tracking and managing different roles held within ongoing groups. These tools could display group member access and contribution (with, for example, colour-coded differentiation between roles). Management of the opening and closing of assignments would need to be centralised. The “lesson” module in Moodle allows for a kind of individual workflow, but this does not appear to support group-based collaborative activity. More promising is the work on activity locking and contingent activities, which can be found in the Moodle forums (<http://moodle.org>). Furthermore, the IMS specifications, which will permit workflow, have been realised in LAMS (<http://lamsfoundation.org>).

5. Conclusion

Our technical reading course was designed to match group work to the expectations Japanese students have about learning practices. We used a LMS (Moodle) to design a course using some of the group work procedures implemented by Oakley et al. [8] in large engineering classes. These procedures are similar to those experienced by Japanese students in their public school education, but are also suggested by the role-based group work system described by Cole and Engeström [9]. We found that the implementation of a role-based approach to group work was well accepted by students, since they actively participated, but the management of this approach, when using a LMS, needs improvement. We make three main recommendations for the improvement of group work tools: 1) the composition of groups requires increased flexibility, 2) group evaluation tools are needed, and 3) management of groups will benefit from workflow tools [14]. With the addition of these three enhancements, it would be easier to organise group work processes and individual roles better suited to our students.

We are working to adapt learning management systems to learner needs. In particular, the principle of multiple engagement [15] is informing our formative evaluation of learning technologies. This is an important new direction in matching LMS tools and group work management strategies to learner needs.

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