# Using Moodle and Other Software Tools In EFL Courses
# In a Japanese IT University

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## Abstract

*Throughout their public school education, Japanese students are socialized into cultural learning practices [1] that emphasize group-oriented tasks. Well-organized group work is paramount to successful EFL teaching in Japan. In this paper, we look at how Moodle an open-source learning management system, is used at a Japanese computer science university to organize both individual and group tasks. Examples are provided of freeware and open-source software tools, such as CmapTools for concept mapping and Praat for acoustic analysis that can be used within Moodle to enhance EFL reading, writing, and pronunciation courses. We also explore how Moodle can be integrated with collaborative document production tools, such as Google Docs and Spreadsheets. Finally, we demonstrate the use of Moodle as a tool for action research, enabling the teacher/researcher to tightly control the course content in two different courses while systematically varying aspects of the content to test hypotheses about language learning. An important aspect of our work is the systematization of group process in language and communication courses and the development of a context for experimentation.*

## 1. Introduction

University teachers often comment on the reluctance of Japanese students to speak in front of their peers, and the difficulties they have getting students to participate and communicate in the classroom. Our approach to teaching EFL is guided by an awareness of the cultural learning practices into which Japanese language learners are socialized throughout their public school education. Japanese public education has a long tradition of group work [2] and Japanese learning and teaching practices in public school education [3] ultimately influence how students learn in university [4]. The cultural learning practices of most of our students may contribute to shyness and

reticence in learners who resist their language teachers' efforts to promote communicative language learning environments [5]. Notwithstanding the Japanese government's 2003 Action Plan to Cultivate Japanese with English Abilities [6], which is intended to increase oral communication in public school English language education, the emphasis on preparing high school students for university entrance examinations still puts the focus on testable receptive skills. English in Japanese high schools is frequently taught employing the audio-lingual and yakudoku (grammar-translation) methods. Our interest is not to change student behaviors directly, but to build toward autonomous learning through culturally familiar learning practices. To increase student participation in our reading classes and prepare for autonomous learning, we have created a structured environment that accommodates our students' educational background. This structured environment is mediated by Moodle (Modular Object-Oriented Dynamic Learning Environment), an open-source Learning Management System (LMS). The use of Moodle has enabled us to not only structure individual and group tasks effectively, but it has also provided an infrastructure on which various freeware and open-source software packages can be included. In this paper, we will give an account of how Moodle has contributed effectively to EFL reading, writing, and pronunciation courses at our Japanese university and how it can be used to improve the methodology of some action research projects.

## 2. Group management with Moodle

In this section, we discuss our approach to promoting group work in our classes. We are attempting to encourage active participation by all students, to provide access to materials and assignments outside of class, and to support group cohesion.

Until recently, the research literature on Computer Assisted Language Learning (CALL) tended to focus on the individual aspects of language learning. Even if communication within and among groups of students

could be potentially facilitated with technology, social and cultural aspects of CALL were not widely discussed in the literature [2]. Gradually, as LMSs have become more widely used, considerations of the social, cultural, and institutional learning contexts have become more prevalent. Education designed to accommodate cultural learning practices is more likely to benefit students [1], and in the case of Japanese students, this has become feasible now that new designs in LMSs allow for innovative social groupings and workflow that were not possible with earlier software [4].

The classes described in this paper all take place at the University of Aizu, a publicly-funded bilingual (Japanese and English) institution with undergraduate and graduate programs in computer science and engineering. The university's policy is that students are provided with 24-hour access to computers, and results from an informal survey show that over 80% of the students have computers at home. Recent restructuring of the undergraduate English language curriculum has taken into account the accommodation of cultural learning practices of our Japanese students. Much of this work involves the inclusion of group work and peer evaluation processes that resonate with the public school learning experiences of Japanese students that occurred before high school. Beginning with familiar practices provides a non-threatening starting point from which we can build individual confidence and participation. Commenting on Japanese learners, Ross [7] found that formative assessment procedures making use of self-assessment, peer assessment, group projects, and co-operative learning tasks enhance Japanese learner engagement, particularly when students realize that such activities help prepare for summative criteria. Using Moodle, we created a learning environment in which students' Japanese cultural and educational background provided a basis for designing our courses. Not only is Moodle appropriate for managing groups, but also external software tool applications can be integrated within this context.

## 3. CmapTools in technical reading

Ongoing action research in second year Technical Reading courses substantiates this view. Instructors organized each of four classes of about 45 students into groups of three or four, which remained together throughout the semester. Each week there were four related readings taken from a networking textbook. Student group work consisted of two tasks – an individual task and a collaborative task; both tasks were based on the same, or related, texts. The individual tasks were designed around four separate activity roles, which prepared students for the collaborative task. Students were assigned varying individual roles within groups. For the individual reading task, the roles in a group work system [8] were modified to match the learning objectives of the second year Technical Reading courses. Each member of the group was assigned a reading role for the weekly reading text. These roles were divided to promote focused expertise that could be shared with other members of their multi-roled group 9. (These roles were scheduled to be carried out by group members in a weekly rotation.) Each of these roles is described below:

1. 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. Understanding of text structure and general reading comprehension skills were necessary to complete this task. The Main Ideas Seeker was also responsible for recording the main ideas in a searchable public glossary within the LMS.
2. 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 content overview, to a searchable glossary in the LMS. This extensive reading activity provided a vocabulary-rich environment where students read authentic texts on the same, or a related, topic.
3. The Vocabulary Builder focused 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 search-able by all students, regardless of their designated class.
4. 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.

The individual task prepared students for a collaborative task that followed. Having performed their individual 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 individual task. It involved a whole group effort to construct a concept map using open source software known as CmapTools [10]. Concept maps are a type of

visual organizer that is used in EFL instruction and particularly in reading [11]. Concept maps are used to hierarchically organize words or concepts, which are usually enclosed in rectangular boxes and linked by lines. Two nouns enclosed in boxes can be linked by a line with a verb written in a gap halfway between the two. During reading activities, students can deconstruct text and represent the relationships between words by drawing concept maps that link nouns and verbs. This collaborative assignment was due one week after the individual assignments were due and class time was provided to make the concept map. The students preferred working with the same group throughout the term and reported that the group's tasks helped their reading. Furthermore, making concept maps collaboratively provided them with a third pass through the same text with a third purpose. Multiple encounters with the same text provide students with varying ways of encountering the text, thus giving them more time and different perspectives from which to analyze the same text and its structure. These multiple passes through the text also provided them with more opportunities to encounter the same vocabulary items.
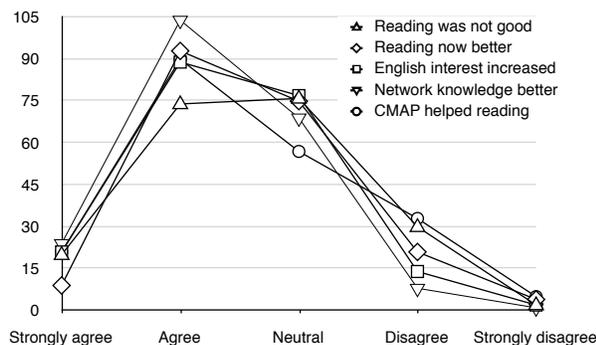


Figure 1. Student evaluation (n = 206)

Student self-evaluation data from 206 second year students (Fig. 1) indicated that structured group work with Moodle was useful and led us to design implementations including additional software tools in other courses with varying linguistic content.

The groupwork and roles scenario described above, provided a framework within which students made use of CmapTools. Software tools implemented within group contexts can assist Japanese students in exploring language content and processes by providing the social software with which they are familiar. In subsequent sections, we examine how other software tools, Praat, and Google Docs & Spreadsheets are being implemented to support student group work in pronunciation and technical writing classes.

## 4. Praat and ultrasound in pronunciation

In a 3rd year Phonetics and Pronunciation course managed in Moodle, students make use of Praat, open-source acoustic analysis software. Presently, after being trained by the instructor on the use of Praat, students are able to record and analyze their own pronunciation. In classes of over 30 EFL students, it is impossible for the teacher to provide constant individualized feedback to every student. However, using Praat learners can become autonomous and objectively analyze their own pronunciation.

### 4.1 Sound and video file use in Moodle

With the possibility of uploading/downloading audio and video files in Moodle, the interactivity of Moodle can be extended. In addition to in-class Praat training, videos demonstrating the use of Praat are posted to Moodle by the teacher and viewed by the students at their own pace when necessary. As individual student activity can be tracked within Moodle, the teacher can see easily which videos are accessed the most and then plan extra help sessions on points that seem difficult.

Using Praat, students are able to measure the duration of paragraphs, sentences, words, and segments that they utter, and compare these durations to a native speaker's natural speaking speed. Students can also display and measure the pitch and intensity of their speech, thus allowing comparisons of their intonation and stress to be made with native speakers' speech. In more advanced classes, students can measure the formants of their speech and compare these with standard formant measurements. All of these measurements, as well as sound files, can be uploaded to the class Moodle site for the teacher to observe, grade, and provide feedback. In addition, the teacher can provide sample sound files for the students to download so that the students have examples of native-speaker speech that they can listen to and measure.

In the pronunciation class described above, each student also has a chance to view the shape and movements of his/her own tongue using ultrasound [12]. This innovative method of teaching pronunciation provides the learner with visual biofeedback that can be used to enhance the acoustic feedback provided by Praat. Videos of the tongue's movements during speech can be saved and uploaded to Moodle and static images of tongue shapes can be extracted from the videos and posted in Moodle for analysis and discussion.

The use of Praat and ultrasound creates an environment where students can become autonomous learners who are able to analyze and correct their pronunciation both inside and outside of the classroom. However, it is possible that the students are not making the most of their learning experience, and that faster

and deeper learning could be attained by shifting the focus to group work, as might be inferred from [5]. This groupwork can be managed by Moodle, where students assist each other to analyze their pronunciation. For example, in this extended group approach, students can use Moodle forums to post waveform images of the acoustic signal of their pronunciation or ultrasound images of the shape of their tongue for a given sound, and then comment on each other's postings. Students can then compare the resemblance of images to those of their instructor (using only the visual, not aural, feedback), and each other. Testing of this approach to teaching pronunciation is ongoing. Using Moodle, we are enhancing collaboration among Japanese students making use of Praat and ultrasound in the Pronunciation course.

## 4.2 Improving action research with Moodle

In the context of language education, Nunan [13] describes action research as being research that is "initiated by a question, supported by data and interpretation, and is carried out by a practitioner investigating aspects of his or her own context and situation" (p. 18). In language education, one type of action research involves comparing two different teaching methods to determine which is most effective. One of the difficulties in carrying out this type of action research is ensuring that the two teaching methods differ only with respect to the criteria that one is testing. If the methods differ in other respects, then it becomes impossible to determine cause and effect. Moodle, because of its very structured approach to course management, is ideal for controlling the content and timing of learning tools and materials. One action research project that is ongoing in some of our pronunciation classes is described below.

A language's "articulatory setting" (AS) is the underlying or default posture of the articulators (i.e., the tongue, jaw, and lips). Although it is something that has interested phoneticians for centuries, and although AS has been included as an element in second-language teaching curricula [14] [15], until very recently, its existence had never been verified instrumentally [16] [17]. The teaching of AS certainly has never been evaluated on a scale that can yield sufficient statistical power. Results of previous ultrasound work on AS [17] have supported calls for the teaching of AS to second-language learners (e.g., Mompeán-González 2003). When considering methodology for learning to pronounce a foreign language, it can be argued that learning a language's AS will help to set the learners' articulators properly such that pronouncing individual sounds and words becomes more natural. Once the differences between Japanese AS and various types of English AS are made clear, it is anticipated that this knowledge will have far-

reaching effects on second-language curriculum design and the contents of textbooks for second-language pronunciation instruction.

Currently, ultrasound research is being done at the Center for Language Research (University of Aizu) to determine the AS for Japanese. As a measure of Japanese AS, inter-speech posture of the tongue (the position of the tongue when it is motionless during inter-utterance pauses) is being used [17]. The ultrasound video images are analyzed in MATLAB and measured to determine precisely the AS for Japanese. Ultrasound, as a speech research technique, has been used previously [18], but only in the last five years has it become affordable and widely available enough to start to be a more common method of doing phonetic speech research, at least in North America and Europe. However, in Japan, with the exception of Nakajima [19], ultrasound has yet to be embraced as a regular tool for speech research.

By using Moodle to organize and present course content, the curriculum can be strictly controlled such that different groups of students either have knowledge and practice of, or no knowledge and no practice of a language's AS. This methodology will enable an empirical test of whether knowledge of a language's AS (and how it differs from the AS of one's first language) helps in acquiring second-language pronunciation.

## 5. Google Docs in technical writing

LMSs, such as Moodle, can support a very structured approach to learning, but the content of a technical writing course can be enhanced by including the LMS itself as an object of study. Besides Moodle's general and most frequent use as an information organizer and LMS, its interface might also be explored in detail as part of a user-interface analysis project for a technical writing course. This type of task also acknowledges the Japanese propensity for groupwork by having groups of students work together to author a complete technical manual (i.e., a quick-guide or a guided tour) on how to use Moodle. This type of assignment can be organized very easily within Moodle and student productivity may be increased by using collaborative document production tools such as Google Docs and Spreadsheets. Google Docs is a free web-based shared workspace (editor) for group editing using bulleted lists, sorting by columns, adding tables, images, comments, formulas, changing fonts, using charts, and so on. Individuals in virtual teams can share, edit, save, export and upload different updated versions of the same document along with their comments from any workstation connected to the internet. Group editing tools can be very effective for organizing technical writing assignments. This is because technical writing assignments (instructional

design, business writing documents, etc.) are organized primarily along the lines of low to high fidelity prototyping of the documents and iterations throughout the life cycle of the document.

Students within a group can adopt different roles in documenting the information regarding Moodle. For example, in a group of four, these roles can be information organizer, layout, formatting and typography editor, graphics editor and comprehensive editor. Depending on the experience of students, an additional role, group coordinator, may be necessary. First, the Moodle interface is analyzed and then all the accompanying documentation needed to describe and explain the interface (e.g., as a user-guide) is handled in the Google Docs interface. Students can register the group members' names, share files, and upload the updated versions along the way. Students can organize the project on the lines of discussing individual Moodle features, one at a time and then sharing comments from individual group members. This discussion can be done very easily using a Forum in Moodle. Once the brainstorming process is completed, student groups can start on the process of iterations of the documents for each version. For each iteration of the document, Google Docs can be used to identify grammar and spelling mistakes by indicating in the version record exactly where they occurred, while students can provide an explanation to support their view, and finally show the correction for the specific version of the document. The final version of the document can then be uploaded to Moodle after saving it in PDF format (something that Google Docs allows).

Students might also find Google Spreadsheet to be a very effective tool for classes involving project management, where there is an emphasis on data collection as part of needs and audience analysis. Charts could be incorporated for subsequent analysis and explanation. For more advanced level Technical Writing classes, students would likely need to be informed about specific topics on a regular basis as they try to move towards a specialized area of interest either for a project or on a general basis. Google Reader might prove to be a very productive tool in that regard. At a more advanced and organizational level, collaborative tools like Sharepoint Server 2007, SocialText might also be productive instruments for running iterative Technical Writing projects. We are currently exploring different models of how the structure in a Technical Writing class can be devised, given the different kinds of collaborative technologies, different levels of students involved, and their broader classification (ESL versus EFL students).

## 6. Trends in collaboration management

In future, students in Japanese universities would definitely feel the necessity to access Moodle and Google Docs from their mobile phones as part of remote groupwork management. Once a Google doc or spreadsheet account is set up, phones might be set up to send an e-mail to the account holder with a URL link that provides access to the updated versions of the document or the spreadsheet. As soon as a new e-mail were posted, the mobile phone might be made to ring, without accessing the mailbox. Moodle can also be accessed from mobile phones by linking web 2.0 applications to Moodle modules. (There are some on-going issues regarding enabling cookies to access the content as well as readability issues on mobile phones.) An important requirement will be ease of access of Moodle pages via mobile phone and to ensure that mobile usability is enhanced at all times [20]. The usability issue becomes more complex when using Moodle and the Google Docs interface from the perspective of a Technical Writing student. For an advanced Technical writing class, the issue of interface usability might be correspondingly complex, because students would not only want to access the editor in the mobile phone interface, but they might also want to modify the screen layout, because the mobile phone browser and the size of the screen would change the visualization aspect of the entire document.

There is a tremendous potential for combining the features of Moodle and Google Docs and Spreadsheets for teaching Technical Writing, but this approach is still something that remains unexplored to a large extent. With the flexibility that Google Docs and Spreadsheets offer, the constraints present in Moodle and Class Forum are somewhat remedied. However, we will need to wait until later releases of Moodle for roles, group assessment, and workflow.

## 7. Conclusion

The authors' courses were designed to match groupwork to the learning needs of students in Japan. Moodle was used to design courses that included groupwork procedures, which have previously been implemented in large engineering classes in the USA [8]. These procedures bear some similarity to those learning practices experienced by Japanese students in their public school education, but are also suggested by Cole's and Engeström's dialogic and role-based groupwork system [21]. We found that the implementation of a role-based approach to groupwork was well accepted by students in a technical reading context (Fig. 1), and are extending this strategy to the design of pronunciation and technical writing courses. The management of classes that make use of groupwork and roles is simplified through the application of Moodle. Using Moodle to manage groupwork, CmapTools were implemented in a technical reading course. The success of this application has lead to the inclusion of Praat in a

pronunciation course where groupwork strategies are being trialled and improved using action research. Further explorations integrating software tools and Moodle in a group environment include the use of Google Docs and Spreadsheets in a technical writing course. In all cases, our goal is to match the technologies to the learning needs of students in the specific content areas. It is important to note that although Moodle has worked well as a groupwork management system in the technical reading classes described above, it is possible that in some contexts where cultural learning practices are not groupwork oriented, using Moodle for individual tasks, such as described in the pronunciation course, would be more appropriate. Formative evaluation and action research continue to guide our implementations.

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