INTEGRATING MOODLE-BASED ACTIVITIES INTO TEACHING ENGLISH FOR MEDICINE: INSTRUCTIONAL DESIGN AND EVALUATION

Jun Iwata
Shimane University
j_iwata@med.shimane-u.ac.jp

Yuko Tamaki
Shimane University
tamaki@soc.shimane-u.ac.jp

John Clayton
Waikato Institute of Technology
John.Clayton@wintec.ac.nz

ABSTRACT

This paper outlines how the authors designed and deployed a blended-learning model for English language teaching at Shimane University in Japan. It describes the design and structure of the English courses and also comments on students initial reactions to this blended environment. Further evaluation of this environment was undertaken using a learning environment instrument. The paper describes how this learning environment instrument was developed and discusses the data generated through the use of this instrument. The paper concludes by stating four key points; firstly, that provision of technical support is crucial in ensuring on-going learner engagement. Secondly, Moodle-based activities created for students with a high degree of interactivity and feedback are most valued. Thirdly, materials created for learners should be graphic rich and visually appealing. Finally, the enhancement of traditional courses by providing access to Moodle activities is appreciated by the students.

1. INTRODUCTION

In this globally connected world English has become increasingly important for Japanese medical professionals. There is growing need for them to understand and use English at conferences and/or workshops in the presentation of papers or the exchange of ideas. As well there are ever increasing opportunities to communicate with other medical staff and patients in English (Kawagoe, 2005; Telloyan, Iwata & Iga, 2009). Unfortunately, due to the existing extensive curricula of medical schools in Japan, English classes are usually scheduled only for the first 2 to 3 years of a 6-year-long curriculum. This limited exposure to English is insufficient to improve students' English communication skills to the levels necessary for their future career. The need for learners to be proficient in English, combined with an already overcrowded curriculum, places a great deal of pressure on medical school teachers of English. They need to review their pedagogical approaches and strategically plan when to teach, identify what needs to be taught, organise how they should engage their learners to fully maximize the impact of the time allocated for English teaching. In addressing these questions a number of English teachers at medical schools in Japan have firstly, focused on designing a curriculum teaching English for specific purposes and secondly, have begun exploring the use of Information and Communication Technologies (ICT) to deliver media-rich and interactive content to learners.

Since 2007 the authors of this paper have been evaluating their current teaching practices and modifying the structure and content of their English classes to provide maximum benefit for their students. As part of this reflection they have designed and deployed a range of e-learning activities in Moodle, a popular open source Learning Management System. These e-learning activities include providing feedback, summative and formative, through a variety of quizzes, encouraging ongoing debate amongst participants with the use of forums and promoting reflection on their learning by personalised journals. The authors' key drivers for the deployment of these Moodle-based activities into their English classes were;

- Firstly to introduce the concept of "blended-leaning" to students. This blended learning approach enhances the traditional "face-to-face" with ICT-exercises and maximises the time allocated.
- Secondly, to create a "learning community" where students' would be able to collaboratively work on task both within and outside scheduled learning hours. This would increase learner motivation.
- Thirdly, to give learners with more opportunities to practise their English skills by providing them with ongoing access to a range of useful learning resources through Moodle. This would encourage autonomous study.

The following section outlines the structure of the blended learning model, describes the development of an instrument to investigate the learning environment created and discusses the results obtained from the use of this instrument.

2. THE BLENDED-LEARNING MODEL

Blended learning typically involves combining aspects of traditional face-to-face activity (such as scheduled weekday sessions or block courses) with computer-mediated support (such as the presentation of interactive simulations on a CD to be completed at home, or the provision of online support through the communication tools embedded in a learning management system (LMS). Blended approaches attempt to thoughtfully "blends" time-constrained and place-dependent, (synchronous) activities, with time-independent and flexible (asynchronous) activities (Clayton, J., Elliott, R., Saravani, S., Greene, N., & Huntington, N, 2008). Through a blended approach, teachers and students are encouraged to work together to improve the quality of teaching and learning. The approach makes it possible for teachers to make available, at all times, a wide variety of learning activities and digital assessments meeting a broad range of learners needs. It is anticipated this flexibility of delivery will ultimately result in improved student learning outcomes (Banados, 2006). The blended learning design is illustrated in Figure 1 below.

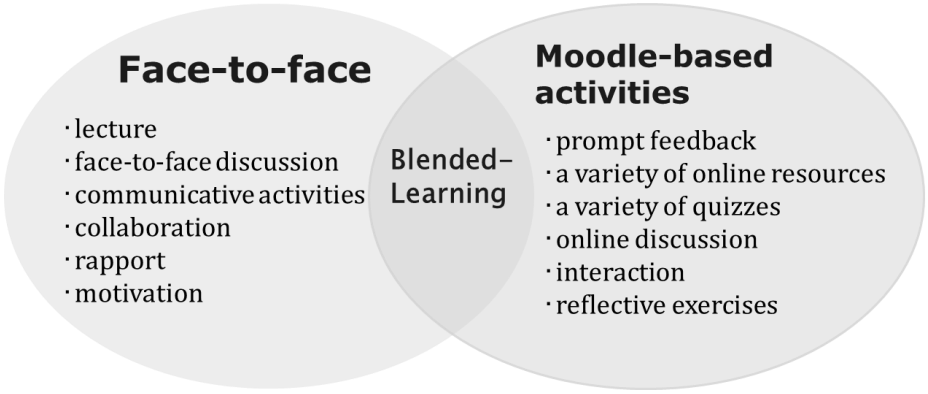

Fig 1. Outline of a blended-learning design

2.1 Moodle: Modular Object-Oriented Dynamic Learning Environment

Moodle, the acronym for the modular, object-oriented dynamic learning environment, is an open source Leaning Management System (LMS) that provides educators with a range of e-learning functions. Moodle enables teachers to; present content in a variety of formats, communicate with students using a range of functions and mange learners' progress with administrative and reporting tools. Over the last 15 years Moodle has attracted a large and diverse community providing educators with the ability to create pedagogically sound online environments at a relatively low cost (Martinez & Jagannathan, 2008). The teachers at Shimane University Medical School started to use Moodle in their English classes in 2008. Using a task-based approach independent Moodle spaces have been designed, developed and deployed for each

identified English lesson. To access the courses assigned each student is provided with a user account and password. A typical Moodle interface is illustrated Figure 2 below.

Fig 2. Moodle English site for medical students at Shimane University

2.2 Structure of Blended-Learning Model

Each English lesson is based upon a blended-leaning model that consists of face-to-face instruction enhanced by structured e-learning activities. The exact nature of the 'blend' is defined by the time allocated, the content to be covered and the reporting requirements of each individual English courses offered. Table.1 below shows a sample teaching procedure of the Reading class for second year medical students. In this example face-to-face sessions and Moodle-based activities account for about fifty percent of the ninety-minute-long class.

Table.1 Teaching Procedure of a blended-learning English class (Reading class for 2nd-year students)

	Procedures	Allotted Time (min)	Use of Moodle	Students' activities
1	Review Test	15	✓	Work on vocabulary and listening quizzes
2	Text-based Teaching	35		Work on reading comprehension
3	Conversation practice	10		Work on pair/ group work
4	Further reading	15	✓	Work on further reading using online resources
5	Forum / Assignment	10	✓	Write one's own idea/ opinion
6	Journal writing	5	✓	Write a journal for reflection

2.2.1 Review Test

Review Test for the Reading class consists of three types of quizzes; two vocabulary quizzes (Fig 3) and a dictation quiz (Fig 4). These quizzes aim to build the students' vocabulary and listening skills. The students can receive feedback of their test results immediately after they have completed the tests.

Fig 3. Vocabulary quiz

Fig 4. Dictation quiz

2.2.2 Further Reading

Moodle allows teachers to provide their students with supplementary online resources to enhance their understanding of the concepts taught in class. Figure 5 below shows an example of supplementary resources teachers have selected to enhance student understanding of a symptom called 'atherosclerosis.' This lesson begins with teacher-led instruction based upon a recognised text and then leads to individual activities where students review the selected resources on Moodle. This blended approach allows teachers to establish a framework in face-to-face sessions and provides students the opportunity to engage with online resources independently.

Fig 5. Resources for further reading

2.2.3 Forum, Assignment and Journal

Moodle provides the teacher with a number of functions to encourage reflection, both individual and group, and monitor progress. In this blended approach the teachers used the Forum function (Fig 6) to provide a space for learners to express their ideas and/or opinions. This is ongoing interchange of ideas in English is often difficult in a face-to-face class. The Journal function allowed learners to individually reflect on their

progress in English and allowed teachers to assist with identified tasks to meet the individuals' specific need. The assignment function was used as a reporting tool for administrative and accreditation purposes.

Fig 6. Forum

2.2.4 Evaluation of Blended Model

At the end of the Reading class the teachers surveyed the effectiveness of the blended-learning model. This evaluation was based on 3 questions answered anonymously by 81 students. The three questions were;

(1) Do you think that the blended-learning model in class was effective for your English study?
(2) What do you think about the ratio of face-to-face instruction and Moodle-based activities?
(3) Which Moodle functions do you think helped you with your English study?

The results of this evaluation are illustrated in Tables 2, 3 and 4 below.

Table 2. Result of questions (1)

(N=81)

(1) items	number	percentage
Very effective	16	19.8 %
Effective	54	66.7%
A little effective	8	9.9%
Not so effective	3	3.7%
Not effective at all	0	0 %

The results obtained from Question 1 indicate the significant majority (86.4%) of the students thought the blended-learning model was effective for their English study.

Table 3. Result of questions (2)

(N=81)

(2) items	number	percentage
We want a lot more Moodle activities	4	4.9%
We want a little more Moodle activities	10	12.3%
Well-balanced	62	76.5%
We want a little more F2F instruction	3	3.7%
We want a lot more F2F instruction	2	2.5%

The result obtained from Question 2 indicates a significant majority of students (76.5%) thought that ratio was well-balanced with 17.2% students wanted a more LMS-based activities.

Table 4. Result of questions (3)

(3) items	number	(N=81) percentage
Dictation	67	82.7%
Spelling (Vocabulary)	58	71.5%
Matching (Vocabulary)	50	61.7%
Feedback from teachers	40	49.4%
Grades	40	49.4%
Assignment	28	34.6%
Resources	28	34.6%
Forum	24	29.6%
Journal	19	23.5%

The results obtained from Question 3 highlight learners valued Moodle quiz functions higher than any other function. This is illustrated by the top learning activities; Dictation, Spelling and Matching, all been based on the quiz function. Approximately half of the students found feedback from their teachers on their test results; assignments, forum and journal were helpful for their study. Forum and Journal were the least appreciated functions.

These results indicate that in general, learners seem to think that the blended-learning model was effective, the blend of face-to-face instruction and Moodle-based activities was appropriate and that Moodle functions providing automated feedback, such as quizzes, helped them in their studies.

3. LEARNING ENVIRONMENT RESEARCH

A learning environment is the interaction that occurs between individuals, groups and the setting within which they operate. The investigation in, and of, learning environments has its roots nourished by the Lewinian formula, B=f(P,E). This formula identifies that behaviour (B) is considered to be a function of (f) the person (P) and the environment (E). It recognizes that 'both the environment and its interaction with personal characteristics of the individual are 'potent determinants of human behaviour' (Fraser, 1998). In essence a learning environment can be defined as the interactions that occur between individuals, groups and the virtual or physical setting they operate within. The environment created, (also referred to as climate, atmosphere, tone, ethos or ambience), is regarded as an important component in the learning process (Fraser, 2001). For nearly forty years learning environment researchers have found the perceptions of participants undertaking educational activities provide a comprehensive insight of the environment within which they work (Fraser, 2002, Clayton, 2009). Researchers have used the insights obtained from the data collected to improve teaching and learning practices. This ability to measure, gather and analyse data on activities occurring in educational environments can be seen to be a decisive component in the evaluation of teaching practice and for the prediction of educational performance (Dorman, 2001). Psychosocial instruments have been developed to explore participant perceptions in a range of digitally enhanced educational settings including web-based (Chang & Fisher, 2001), online (Pearson & Trinidad, 2005), and digitally structured web-spaces (Iwata & Clayton, 2008).

The authors believed it is feasible to develop a psychosocial instrument capable of successfully analysing students' perceptions of Moodle-based activities used to enhance learning environments. It is envisaged the data generated from such an instrument would firstly help investigate students' perceptions of e-learning content and secondly, evaluate whether the content presented meets the students' needs and thirdly, inform teachers of the effectiveness and appropriateness of learning activities presented to students and help them identify which parts of the content they need to modify.

3.1 Developing a Learning Environment Instrument for English Language Teaching

After an extensive review of the literature an instrument was created to investigate student's perceptions of their experiences in an online learning environment as shown in Table 5. The instrument was based on four scales, "Computer Competence (CC)", "Active Learning (AC)", "Information Design and Appeal (ID)" and

"Reflection (RT)". Each scale consisted of 6 items. Each of the scales and items had been used in previous learning environment research and could be considered to be reliable (Clayton, 2009).

Table 5. Instrument for investigating students' perceptions

Scale	Description	ID	Items
Computer Competence (CC)	How is the student engaged with digitally stored information and how do they relate to the information presented?	CC1	I am confident and competent using a computer.
		CC2	I am confident in using the World Wide Web to search for information.
		CC3	I am confident in using the web-browser tool bar (back, forward, home, and search).
		CC4	I am able to reconnect to the network if anything goes wrong.
		CC5	I know what to do if a computer 'error message' occurs during my learning.
		CC6	If necessary I can electronically store information on my computer or disk.
Active Learning (AC)	How is the student engaged with digitally stored information and how do they relate to the information presented?	AC1	The feedback I receive from activities / quizzes helps me to identify those things I get wrong.
		AC2	The feedback from activities / quizzes helps me to locate where I am having difficulties.
		AC3	I am motivated by the responses I get from the activities / quizzes included in this course.
		AC4	The activities / quizzes provided in the course enhance my learning.
		AC5	The responses provided during the activities / quizzes are meaningful to me.
		AC6	The responses to the activities help me understand where I am having difficulty.
Information Design & Appeal (ID)	What are the features of the interface created that enhance / inhibit student learning and navigation?	ID1	The choice of colors and style used in the text assisted my being able to read clearly.
		ID2	The backgrounds used in tables and pages enhance the look of the material.
		ID3	The material presented is visually appealing.
		ID4	The material shows originality and creativity in the layout.
		ID5	I find the videos (audios) used in the course are appropriate and helps me understand the topic.
		ID6	I find the graphics (photos, images and graphs) used are well designed and visually appealing.
Reflection (RT)	How are students encouraged to reflect on their learning, are they satisfied with the environment and how do they relate to the environment created?	RT1	I find using the internet for learning is stimulating.
		RT2	I have no problems accessing and going through the materials on my own.
		RT3	I feel I am in control of my learning as I review the material provided.
		RT4	I feel the web based learning approach can substitute for, or enhance the normal classroom approach.
		RT5	I feel I learn more in the online environment.
		RT6	I am satisfied with my experience of using the internet and learning online.

3.2 Results

A web-based form of the instrument was created in both English and Japanese, using Questionnaire module of Moodle. The questionnaire was made at the end of the course in December 2011. The sample comprised 81 medical students taking the Reading course at Shimane University. Given the exploratory nature of the study and the limited number of participants no attempts were made to structure the data based on gender,

age or socio-economic status, although with further data the authors feel this may be a worthwhile area to explore.

3.2.1 Computer Competence

To participate fully in e-environments it could be argued learners have to be technologically literate, confident and competent in using a computer. When analysing the data shown in Table 6, it was found a majority (85.2%) of students were confident and competent in storing information on computer or disk, searching for information using the World Wide Web (77.8%), using a web-browser (72.8%). On the surface it appears students are confident and technologically capable of participating in the e-environment in a controlled setting. However, student's technical knowledge was rather weak with a significant number of them feeling uncomfortable and incompetent when trying to reconnecting to the internet when disconnected (39.5%) and knowing what to do when an error message occurs (42.0%). This indicates that the provision of on-going technical support could be regarded as a crucial service to enable continuing success of learners in digital environments.

Table 6. Result of "Computer Competence" Scale

(N=81)

Scale	ID	1=almost never - to - 5= almost always					Average	STD	% of positive answer (3-5)
		1	2	3	4	5			
Computer Competence (CC)	CC1	3	23	37	13	5	2.93	0.92	67.9%
	CC2	3	15	41	15	7	3.10	0.93	77.8%
	CC3	3	19	31	21	7	3.12	0.99	72.8%
	CC4	7	25	31	15	3	2.78	0.97	60.5%
	CC5	6	28	33	10	4	2.73	0.95	58.0%
	CC6	1	11	28	33	8	3.44	0.89	85.2%

3.2.2 Active Learning

For students to remain motivated in digital environments they should be encouraged to engage with the content presented. When analysing the data shown in Table 7, it was found a significant majority of students felt the responses provided during the activities/quizzes are meaningful (91.4%) and they helped them to identify areas where they were having difficulties (90.1%). They felt the activities and quizzes enhanced their learning (88.9%) and they were also motivated by engaging with the content provided (87.7%). However, about 20 % of the students felt the feedback received during activities could be improved to help them understand where they were having difficulty. These findings indicate materials created for students with a high degree of interactivity and feedback will be appreciated by them.

Table 7. Result of "Active Learning" Scale

N=81

Scale	ID	1=almost never - to - 5= almost always					Average	STD	% of positive answer (3-5)
		1	2	3	4	5			
Active Learning (AC)	AC1	2	13	34	27	5	3.25	0.89	81.5%
	AC2	1	14	29	33	4	3.31	0.86	81.5%
	AC3	0	10	27	37	7	3.51	0.82	87.7%
	AC4	0	9	26	37	9	3.57	0.84	88.9%
	AC5	0	7	28	37	9	3.59	0.80	91.4%
	AC6	0	8	36	32	5	3.42	0.76	90.1%

3.2.3 Information Design and Appeal

It is argued students will perform more productively in their preferred learning environment. Therefore, it was hypothesized that if students felt comfortable with course material presented they would achieve at a

higher standard. When analysing the data shown in Table 8, it was found a significant majority of the students felt the formatting of the text (90.1%), the use of colors in tables and pages (90.1%) and the use of video (audios) (86.4%) and graphics (86.4%) played a useful in illustrating main points and aiding understanding enhanced their learning. Students also indicated and they found the material was visually appealing (80.2%) and showed originality and creativity in the way it was structured (79.0%). These findings indicate materials created for learners should utilize well designed, appealing graphics and videos (audios) extensively.

Table 8. Result of "Information Design and Appeal" Scale

N=81

Scale	ID	1=almost never - to - 5= almost always					Average	STD	% of positive answer (3-5)
		1	2	3	4	5			
Information Design & Appeal	IDA1	0	8	33	30	10	3.52	0.84	90.1%
	IDA2	1	7	36	28	9	3.46	0.85	90.1%
	IDA3	1	15	34	24	7	3.26	0.91	80.2%
	IDA4	1	16	32	27	5	3.23	0.88	79.0%
	IDA5	0	11	27	38	5	3.46	0.81	86.4%
	IDA6	0	11	43	22	5	3.26	0.77	86.4%

3.2.4 Reflection

It has been speculated e-learning students need to be highly self-regulated and be responsible for organizing and reflecting on their learning. They must become self-directed learners. When analysing the data shown in Table 9, it was found student's perceptions of online learning were relatively positive. A significant majority of participants were satisfied with their experience (90.1%). They found using the internet for learning was stimulating (85.2%) they had few problems accessing material presented (87.7%) and they felt they were in control of their learning (82.7%). A majority of students (77.8%) believed online learning could enhance the classroom environment and they felt they would learn more if this occurred (77.8%). This may indicate that online activity sessions for these learners should be an integral part of all learning activities offered.

Table 9. Result of "Reflection" Scale

N=81

Scale	ID	1=almost never - to - 5= almost always					Average	STD	% of positive answer (3-5)
		1	2	3	4	5			
Reflection	RT1	4	8	17	44	8	3.54	0.98	85.2%
	RT2	1	9	20	39	12	3.64	0.91	87.7%
	RT3	0	14	37	23	7	3.28	0.85	82.7%
	RT4	4	14	30	22	11	3.27	1.06	77.8%
	RT5	6	12	37	21	5	3.09	0.98	77.8%
	RT6	2	6	26	39	8	3.56	0.87	90.1%

3.2.5 Discussion

The survey on the use of Moodle indicated that a majority of the students found the blended-learning were effective and the mixture of face-to-face instruction and Moodle-based activities was well-balanced. The learning environment research on the use of Moodle-based activities found that students' expectations of digital environments were high. They believed they would learn more in these virtual environments and they would be motivated by digital material and electronic activities. These findings appear to indicate students want to engage with materials with a high degree of interactivity and feedback. This has implications for teachers that materials created for learners need to utilize appropriate instructional design strategies and techniques. However, the creation, development and publication of digital materials may not be sufficient to meet student needs. The result also indicates student familiarity with computer hardware and software

applications is critical to their perceived enjoyment of online activities. It could be argued the provision of on-going, readily available technical support is critical for students' satisfaction with e-learning environments.

4. CONCLUSIONS

The initial findings from evaluations of this blended model of delivery indicate students appreciated the blend of face-to-face instruction and Moodle-enhanced activities designed at Shimane University. They found the model to be effective in improving their English language skills. Further analysis using a learning environment instrument indicated firstly, that provision of technical support is crucial in ensuring on-going learner engagement. Secondly, Moodle-based materials created for students with a high degree of interactivity and feedback are most valued. Thirdly, materials created for learners should be graphic rich and visually appealing. Finally, the enhancement of traditional courses by providing access to digital materials is appreciated by the students. The study also found that student expectations of digital environments were quite high.

The authors are conscious that there are limitations to this study in that the sample, based within one institution, and of limited size, is a sample of convenience and thus not truly representative of all current students in English for Medical Purposes classes. However, the authors believe the further practice of the Moodle-based activities, adapting a blended-learning model in class and development and refinement of perceptual measures would be valuable in enhancing and monitoring the effectiveness and efficiency of the blended-learning model in English for medicine classes.

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