

October  
2017

Vol.16  
No.3

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Journal of Medical English Education  
年 3 回 2 月・6 月・10 月発行 第 16 卷第 3 号 2017 年 10 月 1 日発行  
ISSN 1883-0951

Journal of

# Medical English Education

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 Japan Society for  
Medical English Education

Official Journal of the Japan Society for Medical English Education (JASMEE)

# *Journal of Medical English Education*

Vol. 16, No. 3, October 2017

*Journal of Medical English Education*, the official publication of The Japan Society for Medical English Education, was founded in 2000 to promote international exchange of knowledge in the field of English education for medical purposes. Until June 2006 (Vol. 5 No. 2), the registered title of the Journal was *Medical English - Journal of Medical English Education*; the current title, which was registered in December 2006 (Vol. 6 No. 1), should be used for citation purposes.

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## 第21回 日本医学英語教育学会 学術集会 開催案内

日本医学英語教育学会は1998年に第1回医学英語教育研究会が開催され、その後、医学英語に関する研究を推進し、医学英語教育の向上を図る目的で学会として発展して参りました。現在では400名以上に及ぶ会員を有しております。

医学英語教育は卒前・卒後・生涯教育として重要であり、医療の国際化、医師国家試験の英語問題導入や医学英語検定試験など、専門職教育の限られた時間でどのように教育を行うかが課題です。学術集会では例年、医療系の英語教育に係わる教員・研究者・医療関係者が参加し研究・事例を報告します。第21回学術集会は下記により開催します。歯科大学での初めての開催となりますので、医学英語教育のみならず、歯学英語についても情報を交換していただければと思います。

### 記

学会名：第21回医学英語教育学会学術集会

日 時：2018年7月28日（土）～29日（日）

会 長：影山幾男（日本歯科大学新潟生命歯学部）

会 場：日本歯科大学生命歯学部（九段ホール）（〒102-0071 東京都千代田区富士見1-9-20）

演題募集：2018年1月15日正午～3月16日 正午

（医学英語教育の目標・教育方法・評価，学生評価，語学教育と専門教育の統合，実践力教育，グローバル人材育成，医学・看護学・医療系教育における医学英語教育，英語教員による医学英語教育，医学・看護学・医療系教育者による医学英語教育，医学英語教育におけるシミュレーション教育・ICT活用，教員教育能力開発，医学英語論文指導・校閲・編集，医学論文作成における倫理，国際学会でのスライド作成と発表法，USMLE受験指導，医療通訳，医学英語検定試験，その他の医学英語教育に関連する演題）

\*筆頭演者は本学会の会員に限ります。非会員の方は演題提出前に入会してください。

\*英語・日本語のどちらでも発表できます。学会ホームページよりご登録ください。

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## First Announcement

### The 21st Academic Meeting of the Japan Society for Medical English Education

The Japan Society for Medical English Education (JASMEE) held its first meeting as a study group in 1998. Since then, the society's main aims have been to promote research in fields related to medical English, and to support and encourage improvements in medical English education. JASMEE now has more than 400 members.

With the globalization of medicine and such recent developments as the introduction of questions in English in Japan's National Medical Practitioners Qualifying Examination, the challenge of how best to make use of the limited time available for medical English education in university curricula is ever more pressing. JASMEE's annual academic meetings seek to address this challenge with a wide variety of presentations, symposia, and workshops given by experts in the field.

Information about the 21st JASMEE academic meeting is presented below. We look forward to welcoming JASMEE members and non-members alike to this meeting, where they will be able to share their experiences and expertise with others in the field to the greater benefit of medical English education in Japan and beyond.

**Dates:** Saturday July 28 and Sunday July 29, 2018

**Venue:** The Nippon Dental University School of Life Dentistry at Tokyo  
1-9-20 Fujimi, Chiyoda-ku, Tokyo 102-0071

**President:** Ikuo Kageyama

(The Nippon Dental University School of Life Dentistry at Niigata)

**Call for papers:** Proposals for papers on the following subjects (or similar) should be submitted  
by March 16, 2018.

- goals, methods, and assessment of medical English education
- student evaluation
- integration of language education and specialized education
- global human resource development
- medical English for nursing and other healthcare-related fields
- the use of technology in EMP education
- faculty development
- teaching of medical writing
- medical English editing
- the art of presenting at international meetings
- USMLE preparation
- medical interpreting
- EPEMP

Submissions will only be accepted from JASMEE members in good standing. To submit a proposal, please access the JASMEE homepage (<http://www.medicalview.co.jp/JASMEE/gakujutu.shtml>).

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Inquiries should be addressed to the JASMEE Secretariat (c/o Medical View, Attn: Mr. Eguchi)

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# Journal of Medical English Education

The official journal of the Japan Society for Medical English Education

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## Editor's perspectives

### Special issue #2: The use of information and communication technology in medical English education

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One of the last of the many innovations my predecessor, Professor Reuben Gerling, introduced as editor-in-chief of the Society's journal was his decree that the October issue every other year would be devoted to a specific topic that would be of particular interest to those of us involved in medical English education. The first such "special" issue, published in October 2015, explored extracurricular activities, and the topic for the second one is the use of information and communication technology (ICT) in medical English education. The current issue contains six articles on this topic, the first of which was produced, appropriately enough, by JASMEE's own ICT Subcommittee, which came into being in 2015 under the chairmanship of Professor Raoul Breugelmans of Tokyo Medical University. Delve in for insights and inspiration!

I would like to take this opportunity to mention a couple of recent developments in the Society. First, congratulations are due to Professor Masahito Hitosugi of Shiga University of Medical Science, his editorial team, and the long list of JASMEE members who contributed to the writing of *English for Medical Purposes, Step 2* (総合医学英語テキスト Step 2). This new textbook was published by Medical View on October 1 this year, a little over a year after Step 1 came out. All involved in this important JASMEE project hope that instructors across the country will find these new teaching materials useful in their continuing efforts to improve medical English education in

Japan.

And second, gratitude is due to Professor Yoshitaka Fukuzawa of Aichi Medical University for the impeccable arrangements he made for JASMEE's 20th Academic Meeting, which was held in Nagoya on July 22 and 23 in the splendid setting of Orque d'Or Salon. (I imagine that some of those who attended the first Academic Meeting in Hamamatsu all those years ago shared the slight frisson I felt as I hurtled over Hamanakako on my way to Nagoya — assuming they approached Nagoya from the northeast, of course!) We are planning to publish conference proceedings in the February issue of JMEE, and all those who gave talks in Nagoya are cordially invited to contribute.

As most JASMEE members will be aware, this year's Academic Meeting was preceded by the sad news of the passing of Professor Tsutomu Saji of the Faculty of Medicine, Toho University. An accomplished clinician and researcher, Professor Saji was also very active in the field of medical English education and was, of course, a great contributor to the activities of JASMEE. He will be sorely missed. His friend and colleague at Toho, Professor Alan Hauk, has kindly written an obituary, which you can find in this issue.

**Timothy D. Minton**

Editor-in-Chief

*Journal of Medical English Education*

# A new e-learning authoring system for members of the Japan Society for Medical English Education

Raoul Breugelmans,<sup>1</sup> Eric H. Jego,<sup>2</sup> James Thomas,<sup>3</sup> and Jun Iwata<sup>4</sup>

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In universities all over the world, information and communication technology (ICT) is becoming an increasingly important part of how students are being educated. To facilitate and promote ICT-enhanced education in the field of English for medical purposes (EMP) education in Japan, the Japan Society for Medical English Education (JASMEE) established the ICT Subcommittee in 2015. The subcommittee has started a new initiative allowing members to create and share e-learning content.

In the past, extensive programming and technical skills were needed to develop interactive e-learning content. But newly available content authoring tools, like Xerte Online Toolkits (XOT), make it possible to create content without much technical expertise.

To facilitate both authoring and sharing of online EMP materials, JASMEE has established an e-learning site consisting of the learning management system Moodle and XOT exclusively for JASMEE members, accessible free of charge at <http://www.jasmee.jp/moodle/>. After obtaining an account, members can freely use XOT to create interactive learning objects and export these for use at their schools in their own courses with their own students. This article describes the most recent ICT Subcommittee initiatives in the hope of encouraging widespread participation in the development and sharing of high-quality e-learning content for EMP all across Japan and beyond.

*J Med Eng Educ (2017) 16(3): 51–54*

**Keywords** information and communication technology (ICT), English for medical purposes (EMP) education, e-content authoring software, Xerte Online Toolkits, e-learning

## 1. Background

Information and communication technology (ICT) is playing an ever greater role in higher education.<sup>1</sup> Language education, in particular, has a long history of embracing technology to enhance learning, such as the tape-based language laboratory in the 1950s through the 1980s<sup>2</sup> and computer-assisted language learning (CALL) since the 1960s.<sup>3</sup> With the advent of Web 2.0 and the ubiquity of smartphones and other mobile devices, the possibilities for the application of ICT to enhance language learning are greater than ever. While our students are mostly digital natives, the majority of teachers

of English for medical purposes (EMP) are not, and many are not taking full advantage of the potential benefits that ICT can bring.

To facilitate and promote ICT-enhanced education in the field of EMP education in Japan, the Japan Society for Medical English Education (JASMEE) established the ICT Subcommittee in 2015. The subcommittee set out to update the society's web presence by creating a new website, which will be accessible at the new domain name "jasmee.jp," and will have a responsive design optimized for both computer and smartphone screens, with a newly designed logo and color scheme. As part of the renewed web presence, the subcommittee has also started a new initiative that will serve as a platform for members of the society to create and share e-learning content. It is hoped that this initiative will help EMP teachers develop and implement effective e-learning materials.

Developing interactive e-learning content used to require

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advanced ICT skill and programming expertise. Teachers or organizations wishing to create e-learning content would therefore usually outsource the creation of such content to specialists. It would typically be expensive, time-consuming, and the final product would be fixed, so the content could not be revised without again spending time and money. This is reminiscent of how we used to go about creating 35-mm slides for lectures and presentations. After deciding on the content and design of the slides, we would place an order with a specialized company to have the actual slides created. This was rather expensive, took time, and the resulting slides could not be revised without actually having them created again.

With the advent of presentation software such as Microsoft PowerPoint and Apple Keynote, however, all of this changed. Nowadays, anyone can produce slides in a matter of minutes, at no additional cost besides the one-time purchase of the software license, and the resulting slides can be revised instantly and repeatedly.

Something very similar has been happening with e-learning authoring. Software systems have been developed that enable less tech-savvy teachers to easily create interactive e-learning content on their own at relatively low cost. While most of these are proprietary commercial systems, a few open-source community-based systems have appeared as well.

## 2. Xerte Online Toolkits

One such open-source system is Xerte Online Toolkits (XOT).<sup>4</sup> Development of XOT was started in 2004 at the University of Nottingham,<sup>5</sup> and is now maintained by the Apereo Foundation.<sup>6</sup> XOT is an online suite of tools aimed primarily at authors who do not necessarily have high-level computer skills, let alone programming expertise. Interactive e-learning content referred to as “learning objects” (LOs) can easily be created by selecting pages from over 70 templates and filling out simple forms. The software automatically generates the LO on the basis of the information in the forms. The type of navigation and the look and feel of the LO can be altered by changing the theme settings with a few clicks. Once an LO is created, it can be deployed in a number of ways. The LO can be exported as a hypertext markup language (HTML) package which can then be imported into a learning management system (LMS) or any other website as an independent LO disconnected from XOT. It can also be embedded into an LMS linked directly from XOT, so that any changes made to the LO in XOT will also be reflected in the LO in the LMS. Finally, the LO can be exported as a sharable

content object reference model (SCORM) package, which allows tracking of user activity when imported into a SCORM-compliant LMS.<sup>7</sup>

XOT is provided under the Apache License, which is an open-source or free software license. Free software is software that is free as in “free speech” (*libre*), but not necessarily free as in “free beer” (*gratis*).<sup>8</sup> XOT, however, is both *libre* and *gratis*, as is the case for the majority of open-source programs. Anyone is free to download XOT from the Xerte Community website, install it on a server, and customize it to fit their needs.

In addition to ease of use for non-technical users and freedom to use and adapt the software, full accessibility for all users, including elderly and disabled learners, is another core value behind XOT. It enables easy creation of online resources that comply with international web accessibility guidelines and legislation, and has aimed to do so from early on.<sup>9</sup> For instance, LOs created using XOT automatically include an inbuilt color contrast changer for use by color blind learners and are compatible with screen reader tools for blind learners. In Japan, the “Act for Eliminating Discrimination against Persons with Disabilities” was promulgated on April 1, 2016.<sup>10</sup> Under this law, it is now obligatory to make efforts to provide “reasonable accommodation” to persons with disabilities. For educational institutions, this means that any materials provided to learners must be accessible to all learners, making the accessibility features built into XOT particularly valuable.

The medical interview LO shown in **Figure 1** is a sample created using XOT, based on one of a collection of LOs created in 2008 at the Department of International Medical Communications (DIMC) of Tokyo Medical University on a Gendai GP Grant from the Japanese Ministry of Education, Culture, Sports, Science and Technology. The original LO, shown in **Figure 2**, consists of video footage of a doctor-patient consultation filmed in the UK with accompanying script and comprehension exercises. After filming the videos, the dialogue transcripts and the exercises were created by the EMP staff at the DIMC, but the production of the LO was outsourced to a company that specialized in the production of e-learning materials, at a cost that would be prohibitive without a considerable grant. Creation of the online collection of LOs required months of planning and programming. The current sample, on the other hand, consists of the same video clips, transcripts and comprehension exercises, but this time packaged by a member of the EMP faculty into an interactive LO using XOT, requiring only about an hour of work.



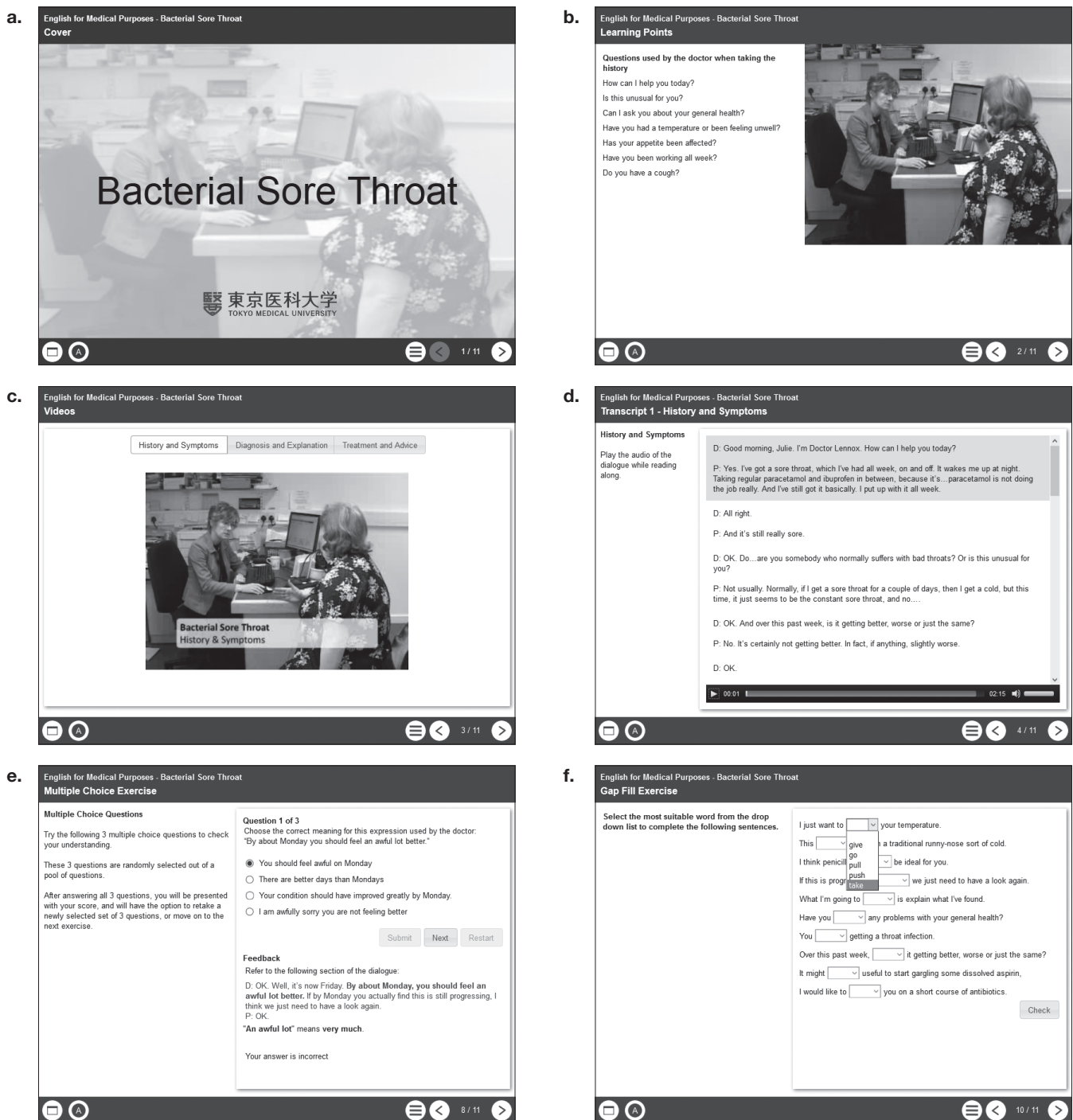


Figure 1. Medical interview LO sample created using XOT.

(a) Title page, (b) Page presenting the case, (c) Videos of the doctor-patient interaction, (d) Audio of the doctor-patient interaction with synchronized transcript, (e) Multiple-choice comprehension questions, (f) Drop-down gap-fill questions.

### 3. Towards an EMP e-learning repository

Thanks to the appearance of content authoring tools like XOT, the technical barriers have been dissolved, allowing subject matter experts to focus on instructional design and pedagogical strategies when authoring content. As more EMP teachers start authoring online materials, there is a real risk of spending considerable time and effort on developing con-

tent that was already created by somebody else. Although it is recognized that mutual sharing of content is an ideal way to prevent reinventing the wheel, it was not really practical to do so until fairly recently. With the advent of new types of copyright licenses like Creative Commons,<sup>12</sup> and as the web continues to evolve, collaborative creation, sharing and adaptation of reusable content have finally become feasible and practical.

To facilitate both authoring and sharing of online EMP

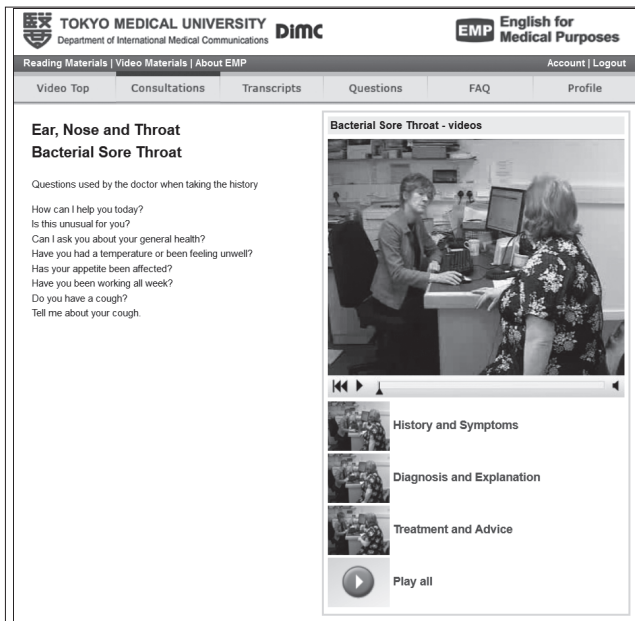


Figure 2. Original online resource created in 2008.

materials, JASMEE has established an e-learning site consisting of the LMS Moodle and XOT exclusively for JASMEE members, accessible free of charge at <http://www.jasmee.jp/moodle/>. Moodle is a popular LMS used by numerous universities and other organizations worldwide. Its most widely used features include the creation of online courses, delivery of educational resources, administration of quizzes, submission and grading of assignments and collection of feedback. After obtaining an account, members can freely use XOT to create interactive LOs and export these for use in their courses with their students, share them with other JASMEE members on Moodle, or if they wish, make them available to the general public under a Creative Commons license. As both Moodle and XOT are open-source systems, and the installation and administration are done by the ICT Subcommittee, there are no costs involved in the e-learning system other than server rental costs. JASMEE members who wish to obtain an account should contact the JASMEE Secretariat.

It is the hope of the ICT Subcommittee that many JASMEE members will find the new e-learning authoring and sharing system useful, and that together we can start building a repository of high-quality reusable e-learning content for EMP.

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# Information and communication technology at Nihon University School of Medicine

Eric H. Jego

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Despite the lack of consensus regarding the effectiveness of information and communication technology (ICT) in the classroom, ICT usage within educational contexts is expanding. ICT use in the classroom should always be implemented very carefully to ensure that the goal is always focused on achieving course learning objectives.

At NUSM, the implementation of the Plan-Do-Check-Act Cycle, and TOEFL test results analysis will continue to have an impact on ICT usage and monitoring of the effectiveness of ICT usage in the English program.

This paper will describe how ICT is being used at NUSM with a particular focus on four specific implementations: Quizlet, Moodle, Flipped Classroom and Google Drive. While other usage scenarios exist, this paper will be limited to a description of these four. Better student-centered approaches can be achieved with carefully selected ICT methods at Japanese medical schools even with limited human resources and budgetary constraints.

*J Med Eng Educ (2017) 16(3): 55–57*

**Keywords** information and communication technology(ICT), medical English education, pedagogy, student-centered learning, active learning

## 1. Introduction

In medical education research, there is a lack of consensus regarding the effectiveness of information and communication technology (ICT) in the classroom. A recent meta-analysis showed that the use of virtual patients resulted in better learning outcomes for novice medical and nursing students but not for clinicians.<sup>1</sup> Here, a convincing argument is made that ICT may be more effective for some groups over others. To complicate matters, there are several studies which present robust evidence to support ICT in education. Among these are some showing the effectiveness of ICT enabled Flipped Classroom methodologies both in English language education,<sup>2,3</sup> medical education<sup>4,5</sup> and in university education generally.<sup>6</sup> By contrast, studies also exist which are more critical and even skeptical of the existing evidence praising educational use of ICT.<sup>7,8</sup> Some argue that Japanese university

students, while very proficient mobile phone users, may not have the necessary skills to be able to take advantage of ICT in the classroom. However, a recently published study examined approximately 200 Japanese university students for their computer literacy and found credible evidence to suggest that students may in fact have sufficient computer skills.<sup>9</sup> Given the complicated and sometimes conflicting evidence found in the literature, it is difficult to find any consensus regarding the effectiveness of ICT in education.

## 2. Deciding how to use ICT

Given the plethora of findings in current ICT research, it is important to recognize that this type of evidence alone while useful, is inadequate for the purposes of curricular decision-making. The reason for this is that educational research findings are often difficult to generalize and depend very heavily on environmental factors such as the types of students involved, the educational context, the materials used etc. Yet research results can sometimes help to uncover details regarding educational effectiveness of a particular methodology that were previously unknown that could be of use to a particular instructor in a particular context. ICT use in the classroom should always be implemented very carefully and monitored constantly to ensure that the learning objectives are always the main focus. As passionate instructors of Eng-

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This work was supported by JSPS Kakenhi grant 15K01091.

lish at Japanese medical schools seeking to improve on past iterations of educational strategies employed, JASMEE members are particularly susceptible to the glittering promise of better education through ICT. Therefore, it is of paramount importance to prioritize education and learning outcomes when making decisions regarding ICT.

### 3. What is guiding ICT implementation?

At Nihon University School of Medicine (NUSM), ICT applications in education, as with all educational innovations, are now subject to the newly institutionalized enforcement of the Plan-Do-Check-Act or PDCA Cycle<sup>10</sup> for quality improvement. An idea adopted in the 1960 by Toyota and other major Japanese companies, the PDCA Cycle (Total Quality Management) has a long history in Japan and has influenced many of the current top standards in business/quality management around the world including Kaizen, Lean, and Agile. These ideas have worked their way into the educational arena in the past 10 years.<sup>11,12</sup> With the NUSM adoption of the PDCA Cycle, there are new opportunities for quality improvement and monitoring of educational implementations using ICT that did not exist before. As stated in a very influential book about quality entitled *Total Quality Management in Education*, "It is the duty of educational professionals and administrators to have an overriding concern to provide the very best possible educational opportunities".<sup>11</sup>

At NUSM, along with the implementation of the PDCA Cycle, another new development which will continue to have an impact on ICT usage in the new NUSM English curriculum is the adoption of the TOEFL test. For the first time in 2017, all 1st-year students were required to take the TOEFL test, once at the beginning of the first year and once again at the end. The monitoring of the effectiveness of ICT implementations in the program will now become more heavily influenced by the inclusion of the PDCA Cycle and the TOEFL test.

### 4. How is ICT being used at NUSM?

What follows is a more detailed description of how ICT is being implemented at NUSM focussing on Quizlet, Moodle, Flipped Classroom and Google Drive. While other usage scenarios exist, this paper will be limited to a description of these four main usages.

#### 4.1. Quizlet

Quizlet is a free, customizable online vocabulary learning website where teachers can upload word lists and definitions

for students to study. Quizlet uses uploaded word lists and definitions to create a set of interactive learning activities for users complete with automatic audio incorporated into the activities.

For several years, Quizlet has been used for vocabulary building both inside and outside the class, both for individual learning as well as team learning for all of our students from 1st year to 4th year English courses at NUSM. There is a vocabulary list with associated activities for each topic that students can use to learn the content by competing against each other for top scores within the Quizlet record keeping system. With the introduction of the TOEFL test marking a paradigm shift in the direction of the English program at NUSM, Quizlet vocabulary activities will need to expand beyond those based on the current NUSM vocabulary list.

#### 4.2. Moodle

Moodle is a popular learning management system into which all students and courses are registered. With it, teachers can provide students with a variety of materials and activities, student activity can be monitored, and students can also interact with each other in various ways such as peer-evaluation, discussion forums, direct messaging and live chatting.

At NUSM, many of instructors have not been using the Moodle system for their courses. However, activity has been on the rise as more and more instructors are making use of Moodle. For English courses, Moodle is being used for course material dissemination, designing various quizzes and assignments, listening activities using embedded video content, peer-to-peer evaluation using the *workshop* function, live in-class surveys with immediate feedback, and the Flipped Classroom.

#### 4.3. Flipped Classroom

Flipping the classroom involves students acquiring necessary knowledge before coming to class - usually through ICT — so that while in class, students can engage in active learning rather than passively attempting to absorb knowledge being delivered by a lecturer. This transforms the traditional role of the teacher from content deliverer to activity facilitator and guide, which leads to a more student-centered classroom. One essential element defining flipped learning is that students are engaged in active learning and problem solving together with a greater focus on open-ended outcomes inside the class, while the understanding of content, knowledge acquisition and close-ended outcomes are more prominent outside the class.<sup>13</sup>

At NUSM, there are a few courses which follow a flipped



methodology with one in particular, Basic History Taking for 1st-year students, having been described and studied extensively.<sup>13,14</sup>

#### 4.4. Google Drive

Using shared files live and online in the classroom makes it possible to conduct student-centered activities with teacher monitoring and feedback in a dynamic environment even with a large class of over 60 students.

The following is an example of Google Drive implementation in the classroom using Google Sheets (the Google version of MS-Excel): A single sheet can be set up to allow all students simultaneously access and enter their suggestions for a good question they think a doctor might ask a patient in a specified context. What one student types on their screen instantly appears on all the other students' screens so everyone can see what everyone else is typing all at the same time. Students can see each other's ideas and teachers can give immediate feedback that all students can see. This is a particularly effective way to make a large class interactive, dynamic, and student-centered using a very low-cost, low maintenance, simple and elegant ICT solution.

Another student-centered activity is team-presentation building using Google Slides. Similar to MS-PowerPoint, Google Slides presentation files can also be shared and accessed live and online. This means that, for example, that a small group of students could be working on building a presentation together with a single Google Slides file opened on 4 different screens. Students can all add content and make modifications and see what each member is doing at the same time. This eliminates the need to keep track of versions of a presentation and all team members can work on the same presentation at the same time.

Also, by using Google Slides this way, it's possible for teams to have a look at what other teams are doing at any time from their own screen. Another advantage of using Google Slides this way is that submissions for grading can be made using links instead of submitting presentation files. That means the link will always be the latest version so up to the last-minute changes are possible before deadlines.

The Google Drive applications have been freely available for live, online collaboration for several years. However, the most recent iterations are more intuitive, powerful and mobile. An interesting new ICT solution is Google Classrooms which is gaining popularity. Additionally, Microsoft has recently released online versions of their main software applications. With the increasing demand for better ICT implementations for educational purposes, companies are responding and innovating with an expanding list of con-

stantly improving ICT solutions. This is resulting in many more excellent ICT options for instructors than ever before.

## 5. Conclusion

With the growing demands for accountability and quality improvement in education at Japanese medical schools, it is becoming more important for instructors to find better ways to create the best possible environment for our students. More student-centered approaches can be achieved with carefully selected ICT methods combined with quality control measures such as the PDCA Cycle.

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# Using virtual patients in medical English education

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Virtual patients are customisable, interactive computer programmes that can simulate real patient responses with a high level of fidelity. Virtual patients have the potential to allow students to practise communication and language skills in a safe and standardised environment. Such programmes offer additional benefits, over human simulated patients, such as the ability to reduce long-term costs and enable several students to practise with the same virtual patient multiple times. At Keio University School of Medicine we have created a series of programmes that allow students to develop their medical English, doctor-patient communication, and history-taking skills via text or speech input with an online virtual patient. Photo-realistic avatars and text-to-speech software make the user interface more realistic and engaging. Limitations of the use of virtual patients include a potentially steep learning curve for initial development and a high cost if using third party software. Virtual patients show great potential in complementing current teaching strategies in medical English education but further research is needed to quantitatively assess their benefits and limitations in the classroom.

*J Med Eng Educ (2017) 16(3): 58–61*

**Keywords** simulation, virtual patients, artificial intelligence, embodied conversational agents

## 1. Introduction

The use of simulation can be extremely beneficial in medical English education. Performing role-plays, between students or with simulated patients, can allow for the opportunity to develop a number of important language and communication skills. However, there are some limitations that must be considered. Large class sizes, logistical challenges, high costs, and a difficulty maintaining standardisation can impact upon the teacher and learner experience. Virtual patients are an emerging technology that can address some of these limitations and, in addition, offer a number of important benefits.

Virtual patients are electronic, computer-based, simulations that can offer students the opportunity to practice medical communication with an artificially intelligent (AI) programme via a website or application. **Tables 1** and **2** highlight some of the potential benefits and present limitations of using virtual patients for teaching. Currently, there are a relatively small number of institutions documented in the literature that have developed and used AI virtual

patients for the education of healthcare students.

## 2. Examples of virtual patients in the literature

AI conversation robots, or chat bots, have been available for a number of years. Their increased popularity in the video game entertainment industry, and more recently in commercial businesses, has led to a more diverse range of applications for their use. An advantage of AI chat bots is that they can be embedded in a website for customers to interact with. One such example is the use of a chat bot in a customer service website that generates responses to help users with queries or complaints.

Within medical education there are relatively few examples of AI chat bots, or virtual patients, in current use. One research team created an application allowing students to take medical histories using a selection-based system.<sup>1,2</sup> Other groups have also used natural language processing to create virtual patients that can respond to a free choice of user inputs and not just limited text-based selections.<sup>3,4</sup> A team at the University of Ohio developed a virtual standardised patient that students could interview using natural language.<sup>5,6</sup> They described how their students were able to take a medical history and develop a differential diagnosis

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**Table 1. Benefits of using virtual patients**

- Virtual patients are interactive and engaging for users.
- Students can make mistakes in a safe environment.
- Teachers can introduce target language into a medical conversation.
- Patient responses can be standardised with complete fidelity.
- Different scenarios can be relatively easily programmed after their initial creation.
- Once created they can be used an unlimited number of times.
- Multiple students can practise simultaneously.
- They offer the long-term potential to maximise the efficient use of time and money in simulation training.
- They can be programmed to give feedback to users.
- Conversation logs or reports can be automatically generated and sent to the user or instructor.
- Students can utilise speech-to-text software to practise pronunciation.
- Different patient accents can be delivered via text-to-speech outputs.

before encounters with actual patients. The accuracy of their virtual patients' responses ranged from 79% to 86%.<sup>5</sup>

### 3. The Keio Virtual Patient Project

Here, at Keio University School of Medicine, we have created a series of prototype virtual patients for training undergraduate medical students in how to take a basic medical history in English. The virtual patients were created using artificial intelligence mark-up language (AIML),<sup>7</sup> a programming language designed for developing programmes capable of having realistic conversations with human users. AIML utilises a database of possible user inputs that can be matched to an output or response. The programmer creates all inputs and outputs and, consequently, natural language conversations can be patterned after traditional doctor-patient interactions. **Figure 1** shows a simplified flow diagram of how the Keio virtual patient programme works.

The user interface (what the user sees and interacts with) can be fully customisable and currently we use third party software (Sitepal, Oddcast Inc.)<sup>8</sup> to display a photo-realistic avatar. The avatar can alter its facial expressions and utilises lip-synchronisation to deliver the patient response. A simplified representation of the user interface is shown in **Figure 2**.

Predicting every possible user-input is an almost impossible task and, therefore, the programming language uses wild-cards, priority matching, sentence topics, conditionals, recursion, and reduction to address this difficulty. Consequently, the virtual patient can give the same response to a number of different inputs that have the same meaning. **Figure 3** gives

**Table 2. Current limitations of using virtual patients**

- Development requires some specialist knowledge.
- Initial creation cost may be high.
- Initial creation may require a large time-investment.
- Users' non-verbal communication, such as eye contact and body language, can be difficult to evaluate and give feedback on.
- Response accuracy can vary depending upon the system and user.
- Use of virtual patients could potentially encourage bad habits in students if not carefully designed or monitored.

an example.

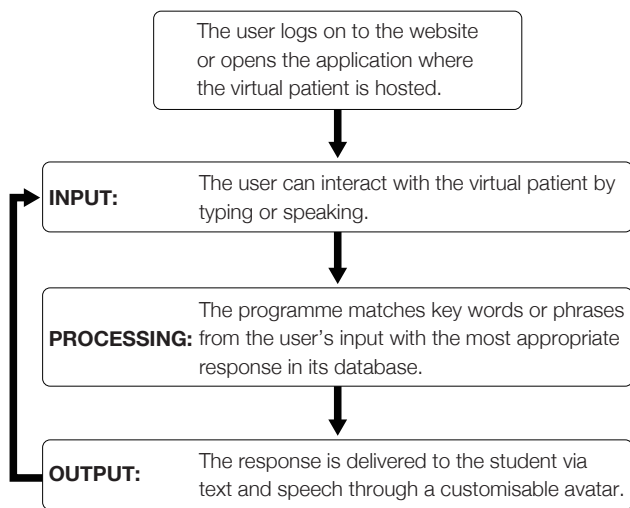
Minor mistakes in the user's spelling or grammar can be accounted for if the programmer wishes. However, if a user asks a question that is unnatural, contains significant mistakes in spelling or grammar, or can't be matched to any programmed response, then the virtual patient can respond in a number of ways. Firstly, it can be programmed to reply with a generic phrase such as, "I don't understand the question. Can you try to rephrase it?" Alternatively, for lower level students, it could give suggestions such as, "Do you mean: grammatically correct question?" This allows the teacher to have a level of control over the difficulty of the encounter and match it to the students' needs.

Another advantage of the Keio virtual patient system is that a conversation log, or record of what the user inputs and how the virtual patient responds, can be generated and emailed automatically to both the student and teacher. This allows detailed feedback to be given to the student and also enables the teacher to adjust responses that the virtual patient gives when necessary.

We are currently in the process of testing and refining the virtual patients, however, preliminary research shows great potential for their use as an additional resource for medical English education.

### 4. Limitations and considerations

There are a number of important considerations for the use of virtual patients. Firstly, although virtual patients could be used as an additional resource to complement student-to-student, or student-to-simulated patient, interactions, their use cannot replace human interaction in clinical or language training. Secondly, the way students interact with virtual patients should be carefully monitored and re-assessed to ensure that the conversations remain as realistic as possible. One way to do this is to regularly review conversation logs and make necessary changes and adjustments to the virtual patients' responses when required. In addition, non-verbal methods of communication, such as eye contact and body



**Figure 1. A schematic diagram of how a user interacts with a virtual patient.**

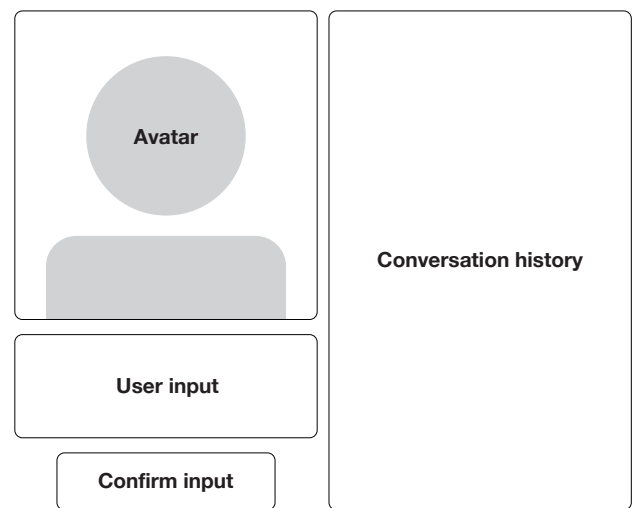
language, cannot be effectively evaluated using currently existing virtual patients. Consequently, it is important to remind students of the importance of these tools and ensure that the use of virtual patients does not encourage bad habits, such as poor eye contact or bad posture.

Another consideration for the Keio Virtual Patient Project was the time and knowledge required to create the initial prototype. Proficiency in an artificial intelligence programming language was essential as there are currently no open-source or commercially customisable templates available. Although the cost of creation was minimal in our prototype project, this has the potential to rapidly increase if third party services or software, such as website servers or graphic design applications, are required. One suggestion to overcome the initial time and cost limitations of designing a similar project is to create a shared and open-source library of virtual patients that can be accessed via e-learning platforms and enable multi-institutional collaboration.

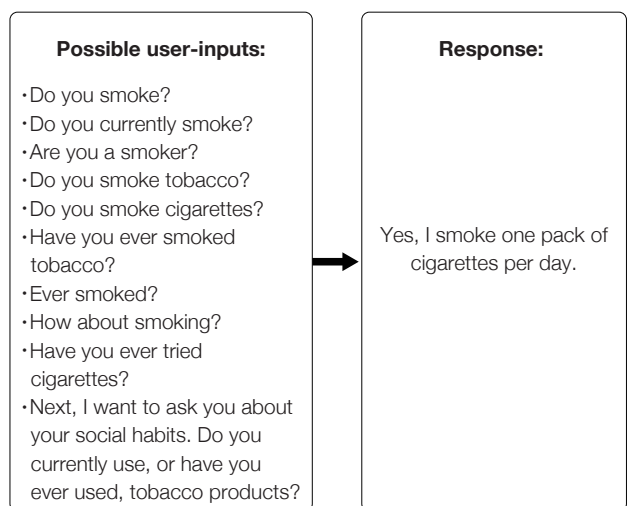
## 5. Future applications

A carefully designed virtual patient has the potential to recognise any user-input and give a realistic and appropriate response. Furthermore, the use of speech-to-text and text-to-speech software means that users can practise oral communication, pronunciation, and listening in a safe and interactive environment.

Virtual patients have the potential to allow teachers to programme various scenarios, including the use of patient symptoms, common idioms, changes in a patient's mood, and even patient-to-doctor questioning. For example, if a teacher wants to focus on the language used by patients to describe pain then a series of virtual patients can be customised to



**Figure 2. A schematic diagram of the user interface.**



**Figure 3. An example of how the programme searches for key words or phrases to select the most appropriate response.**

use specific idioms when replying to the user's questions. Furthermore, the virtual patient could simulate anger if the user asks an inappropriate, offensive, or poorly structured question. Finally, the virtual patient could pose questions to the user such as, "What do you think my diagnosis is?" or "Do you think I'm going to die?"; encouraging the student to consider how to respond to challenging questions.

As well as facilitating the practise of language skills, other uses for virtual patients are possible. Students could be asked to obtain symptoms from a virtual patient and then give a written or verbal summary. Clinical reasoning skills can also be integrated into the experience by asking higher-level students to consider a differential diagnosis, treatment, and management plan.

Avatars are becoming more realistic and can greatly add to the user experience and sense of realism. Current software

allows for lip-syncing technology and high-fidelity facial expressions. Future possibilities include the addition of augmented reality technology that can enable students to see virtual patients in the classroom or clinical setting and interact with them through voice and movement.

## 6. Conclusion

Virtual patients show potential to become an innovative and exciting new resource that can complement current teaching strategies in medical English education. Although their use is still in its infancy, some institutions are starting to explore the possible applications they can have when training healthcare students. At Keio University School of Medicine we have developed a prototype series of virtual patients for use with undergraduate medical students. Further research is needed to refine and evaluate the virtual patients, to increase their realism, and to assess the impact they may have upon learning and teaching medical English.

### Conflict of interest

The author declares no conflict of interest.

No funding was used for this research.

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# Using ICT to create a medical English flipped learning course

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This article gives an account of the role of a learning management system (LMS), Blackboard Learn 9, in the development of a flipped learning course for third-year medical students at our university. We report on how we have placed texts and exercises online to create the course, and show how this process connects with research on providing online materials for second-year students. We describe the factors and decision-making involved in the change, the process of changing from a paper-based to an online set of materials, and how the use of the LMS has allowed us to create and add audio files. We then discuss the ways in which a focus on ICT has created more flexibility in sharing and developing materials, both with academic staff and students. Other benefits of using the learning management system include opportunities to make syllabuses and materials more transparent, to review and reorganize material, and to create more options for future delivery of courses.

*J Med Eng Educ (2017) 16(3): 62–67*

**Keywords** online materials, flipped learning, learning management system (LMS), course design

## 1. Introduction

### 1.1. Background

In this article, we describe the process of putting medical English learning materials online using our university's learning management system (LMS), and consider the advantages of doing so. We report on how we have placed texts and exercises online to create a flipped learning course for third-year medical students, and discuss how this procedure connects with our work on providing online materials for second year-students. The authors of this article all belong to Hiroshima University's Institute for Foreign Language Research and Education, a small non-faculty group of language teacher-researchers. The institute has been involved in providing an intensive medical English course in September since 2012, and a small team of three researchers (Fraser, Davies, Tatsukawa) from the institute received central-government funding for a project to develop medical word lists and course materials for undergraduates in 2013. In 2016, the research team was expanded to include a specialist in ICT

(Enokida) with a view to developing online medical English materials, and again received government funding for this second project. This article documents the fusing together of these two projects.

The initial momentum for changing from an essentially paper-based course to a blended learning course came from an inquiry by the medical faculty about the possibility of reducing the cost of the intensive course. The course is an additional responsibility for the institute, involving extra teaching hours and necessitating the transfer of budget from the medical faculty to the institute. This is calculated on the basis of teacher class time, which in previous years totalled 48 contact hours.

### 1.2. The appeal of a flipped learning approach

In response to the medical faculty's inquiry, we considered converting to a blended learning approach, which would involve much more self-study by students before taking classes. In blended learning, delivery media or methods are often combined.<sup>1</sup> One form of blended learning is 'flipped' or 'inverted' learning,<sup>2</sup> which delivers instructional content online, allowing learners to use classroom time to work through problems and collaborate with their peers in order to develop conceptual understanding. An example of flipped learning had been presented at the JASMEE conference 2016,<sup>3</sup> and the creation of this kind of learning course seemed feasible and highly appropriate in our context: the

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key third-year materials were four-skills based with a strong focus on building up students' medical English vocabulary, and 75 percent of the materials had been created in-house.

## 2. Creating materials and putting them online

### 2.1. Using online instruction to expand learning opportunities for second-year students

Our practical aim, as members of a non-faculty language-teaching institute, has been to provide learning opportunities for medical English that are realistic within the constraints of our university. Given the large size of its faculties and student population, the university's system of administration is necessarily bureaucratic. The strength of a bureaucracy is that it brings order and stability to a complex system, with clearly defined roles and responsibilities for personnel. Its weakness, however, is its inflexibility, meaning that change is often slow. The view of the research team is that students should start their medical English learning as early as possible, and that online materials can contribute to this process; this applies particularly in the second year of students' studies, where the focus is on gross anatomy, histology, and physiology. A major reason for considering online materials is that they can be used to supplement medical courses that already exist and also as self-study materials. In comparison, creating new taught courses is difficult to do within the organizational structure of the university. Consequently, the online project was oriented towards students in the second year.

### 2.2. Original aims for a third-year course

The opportunity we have to teach medical English classes is with third-year students, and our approach has been to work broadly in parallel with students' actual medical studies, so that they can use their conceptual understandings of medicine as a background to the English that they study. For example, medical professors have supplied us with ideas on how students develop their medical knowledge,<sup>4</sup> starting with anatomy and physiology, and then building on this foundation and progressing towards the study of medical conditions and treatments. When it became apparent through their feedback that students placed a particularly high value on vocabulary, we considered the possibility of creating a more lexically-based course. With a corpus specialist as part of the research team, we decided to compile a word list that was integrated with the classroom materials. Through dialogue with medical professors and examination of some of the medical textbooks used, it became clear that students are exposed to a large amount of medical English vocabulary;

however, this is often tagged to Japanese text,<sup>5,6</sup> or presented in the form of glossaries. Our long-term goals are to identify key topic areas and their related vocabulary; to discover the frequently-occurring collocations and word-patterns used within medical English; and to aid students in developing their skills both receptively (reading and listening) and productively (speaking and writing). The original aim for the third-year course was to create a textbook and a pedagogic word list.

### 2.3. Selection of teaching texts

An important issue concerns the kinds of text to treat as models for teaching materials. In early discussions with medical professors we suggested carrying out corpus analysis of reference books such as *Gray's Anatomy*<sup>7</sup> and *Harrison's Principles of Internal Medicine*,<sup>8</sup> as well as building and analyzing a corpus of medical research articles. While the professors were encouraging with regard to the analysis of the reference books, they had reservations about the construction of an article-based corpus. They pointed out that for students in the early stages of their medical studies, reference books are much more relevant than research articles, which although very important, become so at a later stage. The types of discourse seen in many of the reference books, including *Gray's Anatomy* and *Structure and Function of the Body*<sup>9</sup> are more related to explanation than scientific experiment, and our intention is to provide second-year and third-year students with texts that illustrate this kind of discourse.

### 2.4. Bridging the digital divide

While the planning for blended learning was taking place for the third-year course, the research team was simultaneously starting its new project on online materials. The initial objective of the new research was to provide materials for second-year students with a focus on anatomy, histology, and physiology. However, for reasons of content, it was almost impossible to keep the projects separate. This was due to the nature of their development, which can be described as piecemeal. Our institute's involvement with medical English started with a request to provide a course for third-year medical students, and in the early years of the course this had been achieved with relatively little knowledge of medicine. With the development of research on medical English and medical education, we subsequently produced materials which integrated anatomy and physiology in body systems (for example, the digestive system) with diseases related to those systems (for example, reflux esophagitis, colon cancer, duodenal ulcers, and appendicitis). The aim was to introduce key anatomical terms, allow students to see those terms in



Figure 1. The Skeletal System unit table of contents.

context, and talk about the particular body system under study. Students would then study a disease related to the body system, and practice productive skills in the form of doctor-patient dialogues and summary writing.

With a switch of focus towards second-year students, there was clearly a major crossover between our third-year and second-year materials in terms of anatomy and physiology. This became very clear when we asked professors to help us with second-year material planning by providing key vocabulary; many of the anatomical terms in their word lists also appeared in the third-year materials. The issue was further complicated by our original intention to create a paper-based textbook and word list for the third-year students, and to extend learning to accommodate second-year students through online materials. The dilemma was resolved when our ICT specialist received two units of receptive skills material, and demonstrated how they would look when uploaded on our university's LMS, along with the types of exercises that could be created. This represented a clear advance on our rudimentary plan for the blended learning course, which involved placing PDF files online for students to download and use, and we took the decision to use the LMS instead.

### 2.5. Selecting the learning management system

A learning management system is a software system for the administration and delivery of educational courses or training programs. At Hiroshima University, the LMS used is Blackboard Learn 9 (Bb9), and for reasons of practicality and familiarity this is the system adopted for the online component of the course. With Bb9, the time and effort necessary to manage the LMS itself will not be a concern, and we will be able to focus on developing the content of the materials.

The two units of material placed onto Bb9 illustrated the major advantages of using an LMS: students can be registered, study online, and check their own answers; course teachers can monitor students to check that they have done the work. In contrast, placing PDFs online means that teachers have to place their faith in students to do the study, and to find a way

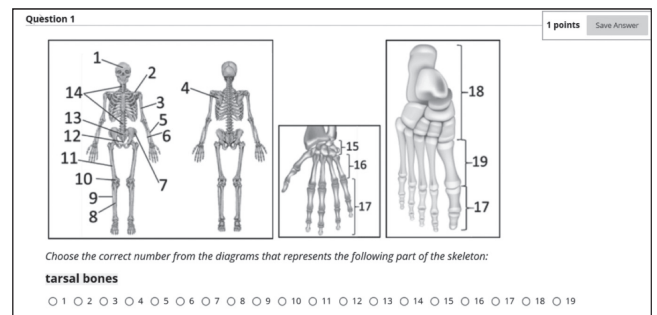


Figure 2. Anatomical terms matching activity using Shutterstock diagrams.

of checking answers, either by supplying them through more PDFs, or setting up classroom sessions for checking. The use of Bb9 also illustrated the merit of combining ICT with medical English syllabus design. The original three members of the research team had focused on combining materials design with corpus analysis, and were concerned more with the content than the means of delivery of the material. Their experience of using the Bb9 system was limited, and they had no conception of how valuable it might be.

### 2.6. Converting paper-based materials for use online

To convert the paper-based units of course material for blended learning, decisions had to be made regarding what to put online and what to retain for classroom-based teaching. Online materials would focus on the vocabulary exercises and essays that contextualized the words, along with comprehension questions on the essays; these would be placed in a section labelled 'Third-year Medical'. Figure 1 shows the table of contents for one of the units found in this section, The Skeletal System. Other units, which are broken down in a similar way, include The Brain, The Heart, The Pulmonary System, and The Digestive System. (The 'Anatomy and Physiology' section is being used for preliminary work on second-year materials.)

One issue to be resolved concerned the use of medical diagrams and photographs. Originally, these had been taken from a variety of Internet sources. While this approach had worked well for materials that were provided as free handouts for an in-house course, from a copyright point of view, it was unsatisfactory in relation to materials that would become more widely accessible on the Internet. The solution was to use purchased medical photographs from the Shutterstock website,<sup>10</sup> which contains a large number of medical diagrams and photographs. However, it was still necessary to ascertain the accuracy of the diagrams by asking medical staff to check the updated materials, and to make amendments where necessary. Figure 2 gives an example of how



<p><b>Speaking</b></p> <p>Work with a partner and do the following activities. Use the words from the boxes to help you.</p> <p><b>Verbs:</b> is composed of   consists of   supports   are supported by</p> <p><b>Other words:</b> skull   vertebral column   rib cage   spine ligaments   muscles   pectoral girdles   limbs   pelvic girdle</p> <p><b>Student A</b> Talk to student B. Describe the axial skeleton.</p> <p><b>Student B</b> Talk to student A. Describe the appendicular skeleton.</p> <p><b>Preparation for Orthopedics and the Knee Section</b></p> <p>Discuss the following questions. Make notes.</p> <p style="text-align: right;"><b>Notes</b></p> <ol style="list-style-type: none"> <li>1. What kind of exercise helps strengthen bones?</li> <li>2. What kind of exercise can weaken bones?</li> <li>3. What kinds of food are good for bones and joints?</li> <li>4. What should you do if you sprain an ankle?</li> <li>5. Have you ever hurt a joint or a bone?</li> <li>6. Which parts of the body have the most complicated bone structure?</li> <li>7. What do you know about the knee joint?</li> </ol>	<p><b>Conversation</b></p> <p>Read the conversation and answer the questions below.</p> <p>A: Good morning Mr Johnson. What seems to be the problem? B: My right knee is causing me a lot of pain. A: Could you tell me more about it? B: Well, my knee has been getting stiffer for a couple of months, but recently it's got a lot worse. A: In what way? B: Well, it's starting to lock when I take exercise, and now there's some swelling. A: I see. What kind exercise do you take? B: I play football at the weekend, and I also do a lot of training during the week. A: What kind of training do you do? B: I run a few kilometers, and then I do some sprinting. A: Have you had any injuries to your knee while playing football? B: A few months ago, I landed badly after jumping high and I jarred it, but I was able to continue playing. A: Is there anything else apart from the pain and the swelling? B: Yes, my knee is now making a cracking sound when I bend it a lot. A: OK. I'm going to examine you, then we'll take an x-ray.</p> <p><b>Questions</b></p> <ol style="list-style-type: none"> <li>1. What are the patient's symptoms? _____</li> <li>2. What exercise does the patient take? _____</li> <li>3. What did the patient do to his knee two months ago? _____</li> <li>4. What is the doctor going to do? _____</li> <li>5. What other questions would you ask the patient? _____</li> </ol>
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**Figure 3. Extracts from classroom materials.**

anatomical diagrams purchased from Shutterstock have been adapted to create a vocabulary matching activity.

## 2.7. Creating recordings for listening and pronunciation practice

A further issue relates to listening and pronunciation. In early meetings on online materials with medical faculty professors, the institute's research team had been asked if it was possible to add recordings. As the institute has a small sound-proof recording studio which is primarily used for the recording of English language learning podcasts, which are then placed online by the institute's specialist (Enokida), both the technology and the expertise were available to do this. Also, from a course teaching point of view, the greatly reduced number of class hours meant that it was important to give students the opportunity to hear and practice the correct pronunciation of the medical terms, both in isolation and in appropriate contexts.

Over a three-week period, two members of the research team (Davies and Fraser) made a total of 28 digital recordings. Although both are speakers of British English, for reasons of familiarity the American pronunciation was used if it was felt that the difference between the two varieties was likely to cause confusion. For each of the seven units of material, there are two recordings of the vocabulary terms, and two recordings of essays. While the vocabulary recordings were usually completed relatively easily and without error,

some of the longer essays were much more challenging, requiring repeated paragraph by paragraph readings until satisfactory results were achieved. The resulting audio files were combined and edited using Audacity software.<sup>11</sup> Video clips were then created by combining the audio files with images related to the topics in each unit. The video clips, together with the transcript files, were uploaded to YouTube, enabling the clips to be watched with captions. This made it possible for students to listen to and pronounce the words and sentences while connecting them to the written text.

## 2.8. Classroom materials

Classroom materials have been designed to focus on productive skills, relating to the online content. For example, regarding anatomy and physiology, students are expected to describe the body system covered in an online unit. In the case of the skeletal system, they are asked to describe the axial skeleton and the appendicular skeleton. In relation to doctor-patient dialogues, after studying a model conversation students perform role-plays based on the conditions covered in the medical essay. While the model conversations were considered for possible inclusion in the online materials, for 2017 they have been retained as classroom materials. This is partly due to time constraints in converting them, but also because they are integral to setting up the role plays. (See **Figure 3** for extracts of the materials taken from The Skeletal System unit.)

### 3. Discussion

The process of putting materials online has had several beneficial effects, particularly in relation to coordination amongst research members and medical staff, developing and delivering materials, making syllabuses and materials more overt, reorganizing material, and creating more options for future delivery of courses.

The use of an LMS in planning a blended learning course has created a new dynamic within the research team. In the medical project, there is a specialization of functions: materials are written by one researcher, checked against corpus findings by another, and then carefully edited by the team. The materials are then sent to the medical doctors to check for errors in content. With the addition of an ICT component, there is the further element of delivery to students, as well as the consideration of how the materials need to be structured for self-checking. In addition, with technical knowledge being shared amongst team members, each specialist develops new skills and understandings in relation to medical English and ICT skills for an LMS.

A major advantage of using the LMS in materials development is the flexible nature of the delivery of materials to students. All members of the research team have been involved in textbook creation in general English, working with publishers such as Nan'undo and Eihosha, to produce textbooks designed for teaching across semesters and academic years. With medical English, the challenge in terms of content and discourse is far greater, and the time taken to develop materials much longer. With an LMS, units of material can be developed and placed online for student access as they are produced. In contrast, the development of a textbook is more problematic, particularly in relation to the compilation of a word list whose items are contextualized and used in learning materials. Also, with a piecemeal approach (focusing initially on third-year students, and now moving towards incorporating the second-year students), the researchers need to periodically undertake major reviews to reorganize material. Material on an LMS can be revised much more quickly than that in a textbook, which can only happen when a new edition is published.

An additional strength of using an LMS system is that it makes the content much more accessible to medical teaching staff. As we have noted in a previous article,<sup>12</sup> the learning of medical English is slightly opaque, with English language learning taking place both in medical content classes and medical English classes. By putting material online, a substantial proportion of the materials used for third-year students is now online and available for inspection. This has the

benefit of making it available to medical teaching staff, who have the means of gaining a clear understanding of the medical English content if they so wish.

### 4. Conclusion

In this article, we have described how the use of a learning management system has been instrumental in the creation of a flipped learning course, and the ways in which a focus on ICT has created more flexibility in sharing and developing materials, both with academic staff and students. The transition towards blended learning is still at an experimental stage, and is presenting numerous challenges. Although initial indications are encouraging, it remains to be seen whether the new course is accorded the same level of positive feedback that previous courses have received; this form of learning requires a greater level of learner autonomy and may be perceived less favourably by those more comfortable with a more conventional approach. However, even at this early stage of the process, it is clear that an LMS offers many more options for materials development than the more traditional method of textbook design, and the teaching team is considering a variety of future directions.

In terms of course development, flipped learning allows for a reduction in classroom contact time while retaining similar amounts of content. This opens up the possibility of creating courses that mesh with changes in university curricula. For example, Hiroshima University is in the process of changing from a two-semester system to a four-term system. With the self-study component of a blended learning system, and a rigorous process of monitoring and evaluation, courses can be adapted to this system. This will be necessary if there is a move away from an intensive course to a term-based course in the future.

Finally, the use of an LMS makes it possible for the research team to gradually build a corpus of pedagogical materials. As we have noted, the research and development is piecemeal, requiring long periods of time, but as we continue our research, a mosaic of broader categories begins to emerge. An LMS allows the opportunity to constantly integrate new tasks into the material to address new challenges as they appear. For example, if, in the future, the research team is asked to address the issue of journal article reading and writing, research can be carried out, and materials designed, built, and added to the LMS. Periodic review and reorganization of materials will be possible. Running through these materials will be the terms and phrases with high value for medical students. An investigation into the role and characteristics of these important items will be the focus of a sub-

sequent article.

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# Survey of e-learning for general English at Hamamatsu University School of Medicine

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This paper provides some novel insights into the opinions/perceptions and usage tendencies of Japanese medical and nursing students after their participation in the Hamamatsu University School of Medicine (HUSM) e-learning English program (currently the ALC NetAcademy Next system). Both qualitative and quantitative data were collected. An on-line survey instrument was developed and made available to six classes of first-year medical and nursing students at the end of the first semester of 2017. A sample of students was also interviewed for their comments to illuminate their responses to the surveys. The main finding of this study is that HUSM medical and nursing students may not be finding the full value of the current e-learning system available to them.

*J Med Eng Educ (2017) 16(3): 68–74*

**Keywords** e-learning, English as a Foreign Language, medical students, nursing students, ALC NetAcademy Next

## 1. Introduction

Since becoming a semiautonomous university corporation in 2004, Hamamatsu University School of Medicine (HUSM) has been moving forward to bring its medical and nursing curricula into the twenty-first century by including technology and innovation. Incremental curriculum revisions have been instituted to meet the current modernizing trend in medical education away from passive learning and staid teacher-centered lectures towards active learning, skills development, Information and Communication Technology (ICT), and the task-oriented nature of medical training. E-learning was introduced into the HUSM first-year medical curriculum in August 2008 with several goals: (1) engage students in developing their English skills based on their own perceived needs, (2) provide self-access to a wide variety of skills development and general English content, (3) allow students to use ICT to enhance their learning experience (and introduce the concept of blended learning<sup>1</sup>), and (4) provide more opportunities for students to engage in English content and skills development beyond the first-year requirement. Within these goals, the intent of the adminis-

tration also aimed at (1) e-learning that helps to promote active learning and (2) promoting globalization by enhancing students' ability to communicate in a foreign language (English) in a seamless approach.<sup>2,3</sup> It is this HUSM e-learning program that is the focus of this paper.

HUSM first introduced the ALC NetAcademy2 e-learning program (Hitachi Software Engineering Co., Ltd, Tokyo) into its curriculum in August 2008 for first-year medical students. The following year, this e-learning system was also made available to the first-year nursing students. ALC NetAcademy2 and its successor ALC NetAcademy Next are e-learning systems for Japanese university students to practice and develop their general English abilities. The system divides the four main skills (reading, listening, writing, and speaking) into separately themed and leveled units as well as providing sections on grammar and vocabulary. This design allows students to freely choose what to study according to their current proficiency, goals and needs; students' progress is tracked by points earned within each unit for each segment completed. Students may then undertake as many of the units/segments in a particular section as they wish or focus on those particular sections fitting the learners' self-assessment of their perceived needs. Thus, this e-learning approach requires students to be able to self-assess their skill levels and have either the intrinsic or extrinsic motivation to self-access and make progress to reach their own goals.

The HUSM administration added the e-learning requirement to the English Department first-year medical English

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and nursing English programs and coupled it to the first-year medical English courses overseen by the full-time English teaching staff, despite this e-learning program being designed as a stand-alone general English course. The coupling of e-learning to the medical English courses meant that any student who did not complete the semester e-learning requirement (initially set as an on-line time goal of four hours per semester from 2008 to 2015) would earn a fail grade for the medical English course and be kept back one year even if they successfully completed the medical English course content. No requirement was set for second-year students or higher grades although they are free to access the ALC program if they wish, but no one oversees this usage. An overview of the current HUSM English program shows it divided into two segments, general English and medical English. The general English program consists of general listening, reading, vocabulary building and presentation skills, and students can be granted an exemption if they achieve a set TOIEC score of 785 points. The medical English program concentrates on health-related topics, doctor-patient conversations, medical vocabulary building, reading medical articles (e.g. from *Nature* and *New England Journal of Medicine*), simulated medical encounters with patients, and learning about the human body systems and associated diseases in English; no exemptions are permitted. However, the HUSM Administration determined that as the first-year students needed to be guided in fulfilling the e-learning requirement it should be bound to the first-year medical English courses and overseen by the full-time staff rather than placed within the general English program which is taught mainly by part-time teachers. This coupling of course content was quite confusing to many students who struggled to complete the set e-learning requirement each semester despite the constant appeals by the full-time teachers. Unfortunately, it soon became obvious that a growing number of students had learned to circumvent it by logging on to the ALC system and simply waiting out the four-hour time goal without actually completing any units and making no progress at all. As a result, in 2017, the requirement was changed from time spent on-line to progress in units studied, with the initial level set at 10% progress per semester; inability to complete this 10% requirement would result in a failing grade for the student in their Medical English I or II class and not advancing to the second year. Nevertheless, a number of questions have been raised by teachers as to the effectiveness of this blended learning approach coupling and how our students can gain the most benefit from their self-access e-learning and participation. Thus, a survey was implemented at the end of the first semester of 2017 to gain some better understanding of the

state of e-learning at HUSM.

## 2. Methods

### 2.1. Participants

One hundred and seventy-six first-year medical and nursing students at HUSM (116 medical and 60 nursing students) were asked to participate in the on-line survey. One hundred and seventy-four responses (116 medical and 58 nursing students) were collected. For this initial survey, this sample of students was considered by the authors to be sufficient to provide an accurate snapshot of their usage and opinions.<sup>4</sup>

### 2.2. Procedure

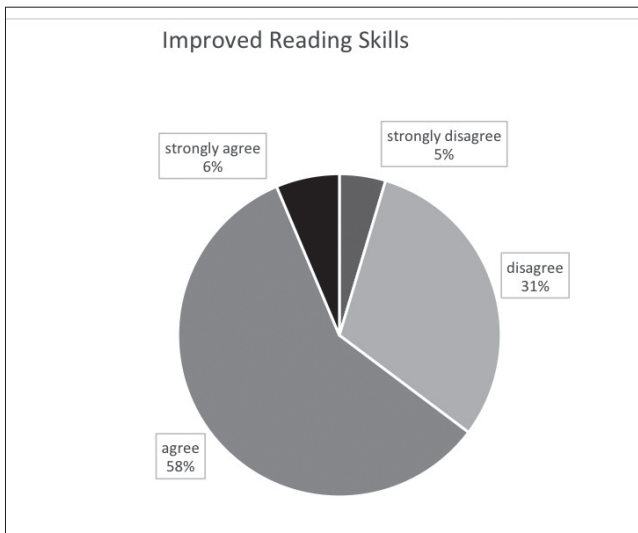
At the end of the first semester in July 2017, a survey instrument on the students' experiences with ALC NetAcademy Next was developed and made available for student access on-line (**Appendix 1**). The purpose was to determine how these first-year students perceived their compulsory participation in this e-learning English program. This survey was provided with questions in both English and Japanese, comprising Likert scale and multiple-choice questions. Students were asked to reflect about the following issues: (1) how they perceived the impact of the e-learning system on their general abilities in English, (2) the positive and negative aspects of the time they spent on e-learning, (3) their impression of the utility of e-learning at HUSM, and (4) how and where they accessed the e-learning system. Apart from the 174 survey responses that formed the data pool for analysis, a small, random selection of students was also interviewed for their comments to illuminate their responses to the surveys.

## 3. Results

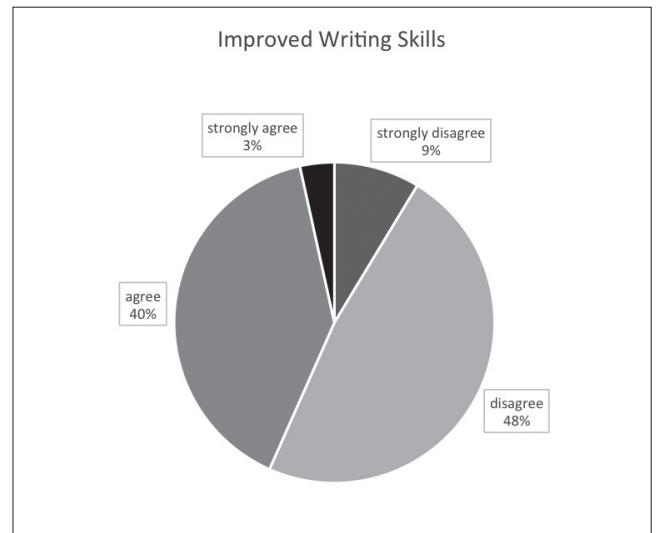
**Figures 1–6** show the raw data as percentages (rounded up) and **Tables 1 and 2** show both (percentages are rounded to one decimal place). The top student's score for each category is shown as a point of reference for comparison with other students' attainment in the e-learning system.

Item 1 of the survey asked if students felt any improvement in their English reading skills from their e-learning experience, to which 63.6% responded affirmatively (**Figure 1**). It should be noted that 39.8% of students recorded zero points attained and 29.0% of students recorded less than 100 points for reading units; the top student score was 450 points.

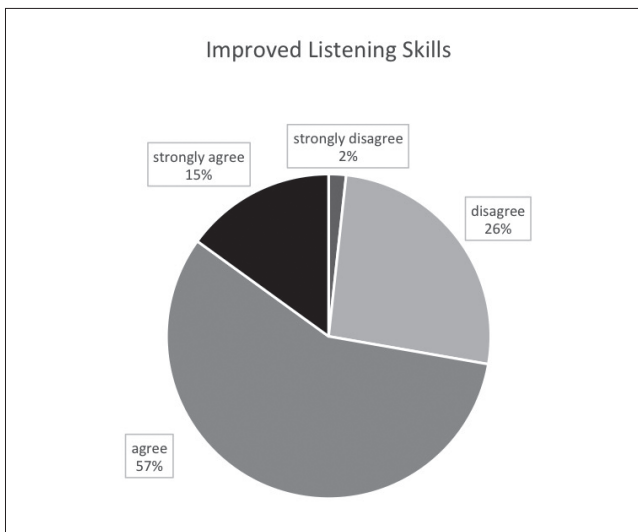
Item 2 of the survey asked if students felt any improvement in their English writing skills from their e-learning



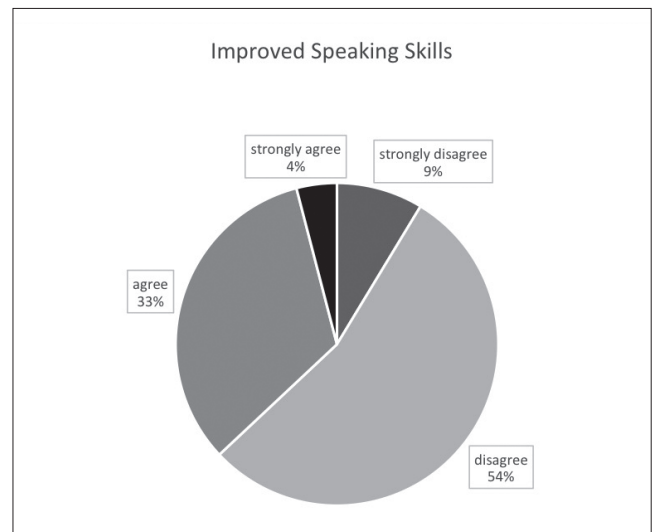
**Figure 1. Item 1. Using the ALC e-learning course helped me to improve my English reading skills.**



**Figure 2. Item 2. Using the ALC e-learning course helped me to improve my English writing skills.**



**Figure 3. Item 3. Using the ALC e-learning course helped me to improve my English listening skills.**



**Figure 4. Item 4. Using the ALC e-learning course helped me to improve my English speaking skills.**

experience, to which 56.7% responded negatively (**Figure 2**). While 18.2% of students recorded zero points attained for writing units, 43.2% recorded less than 100 points achieved; the top student score was 320 points.

Item 3 of the survey asked if students felt any improvement in their English listening skills from their e-learning experience, to which 72.4% responded affirmatively (**Figure 3**). The majority of students recorded most of their achievement points in listening units, with 1.1% of students recording zero points and 27.8% with less than 100 points; the top student score was 1,030 points.

Item 4 of the survey asked if students felt any improvement in their English speaking skills from their e-learning experience, to which 62.5% responded negatively (**Figure 4**). Most students avoided the speaking units entirely, with 76.1% recording zero points and 15.9% with less than 100

points; the top student score was 380 points.

Items 5 and 6 of the survey asked students about their general impressions of their e-learning experience (**Figure 5**). Overall, while most students found the requirement “bothersome,” their general impressions were more positive. The small number of responses to “unnecessary for me” (i.e. the materials were considered to be below the students’ current level of ability) and “irrelevant to my needs” (i.e. the materials were not considered to be developing the skills the students believed they needed to develop for their future career), at 13.5% and 16.7% respectively, suggests that the majority of students did find some general value, no matter to what degree, in e-learning.

Item 7 of the survey asked students if they saw greater advantage in using self-access e-learning to improve their English abilities, to which 73.0% responded negatively



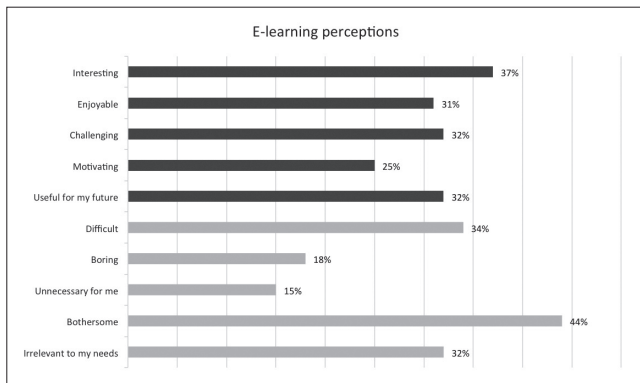


Figure 5. Items 5 and 6. I thought the ALC e-learning course was (check all that apply).

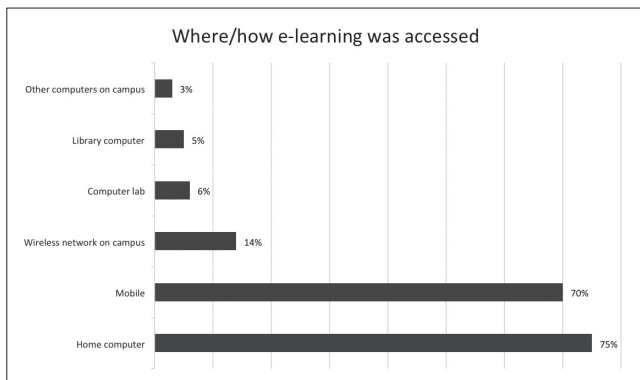


Figure 6. Item 8. Where/how did you access the ALC e-learning course (check all that apply)?

(Table 1). Indeed, students in class often commented that the ALC content had no relationship to what they were studying in their medical English classes.

Item 8 of the survey asked students how they accessed e-learning; the majority used their home computer and mobile devices (Figure 6).

With regard to how much effort was made by first-year students in 2017, Table 2 shows that 75.0% of medical students and 81.1% of nursing students only completed the HUSM minimum set requirement of 10% progress (achieved in the 10.0 to 10.9% band).

The results of this initial survey were most enlightening in that they spotlight some problematic trends in the first-year students' e-learning approaches and performance that are jeopardizing the achievement of the university's stated e-learning goals.

## 4. Discussion

Overall, these results may suggest that the intrinsic and/or extrinsic motivation of the majority of the students' is particularly weak when it comes to e-learning general English despite its novel blended learning dimension.

In survey items 1 to 4 regarding students' perceived

Table 1. Item 7. If this e-learning was available, but not required by the HUSM, would you still login and use it to study?

If this e-learning was available, but not required by the HUSM, would you still login and use it to study?	No.	%
Yes, I would use it to study.	47	27.0
No, I would not use it.	127	73.0

Table 2. Students' completion of the e-learning requirement.

E-learning requirement completion	Medical students, No.	Medical students, %	Nursing students, No.	Nursing students, %
10.0 %	33	28.4	10	17.3
10.1 – 10.5%	30	25.9	28	48.3
10.6 -10.9%	24	20.7	9	15.5
11 – 15%	20	17.2	9	15.5
16 – 20%	4	3.5	1	1.7
21 – 50%	5	4.3	1	1.7
Total	116	100.0	58	100.0

improvement in general English skills, a majority of students agreed that e-learning had helped to some degree with their receptive reading and listening skills (63.6% and 72.4%, respectively). In contrast, a majority of students disagreed that it had helped with their productive writing and speaking skills (56.7% and 62.5%, respectively). These responses may be the result of one of the problems with how the students are accessing the system with their technology, that is, via their mobile devices. Indeed, the students who were interviewed all reported problems using the speaking and writing units through their mobiles.

As to where and how the students accessed the e-learning system, the overwhelming majority did so via their home computer (68.2%) and their mobile devices (63.5%), indicating that students included this e-learning component in their general study time outside the university and possibly in collaboration with other students. One student had reported such collaboration and called it "cheating," whereas what the student may have really been trying to express could be better characterized as "short-cutting." Only 5.2% of students found it convenient to go to the university computer lab located in the Nursing Faculty building (at one end of the campus) or to go to the library (at the opposite end of the campus) to use the computers in open access (4.7%).

As to how the students perceived the utility of their e-learning, none of the positive categories achieved a better result than 33.9% (“interesting”). In other words, only one in three students found the content “interesting” and less than one in three found it “enjoyable” (28.1%). Some students described the ALC materials as “too basic”; however, the students who were interviewed said that if the course included some health-related content they would have had a greater interest in completing more units and possibly more enjoyment as they studied. The degree of difficulty of the units was only “challenging” to 28.6% of students, a result confirmed by the students interviewed who said it was not at all challenging to students who have studied abroad or who have already achieved a high TOEIC score.

As just 22.4% of students responded that their e-learning was motivating, it could be said that the HUSM approach to e-learning was not motivating to approximately four-in-five of our first-year students. This finding calls into question the university administration’s contention that providing such e-learning would be highly motivating to students accustomed to using technology regularly in their daily lives, or so-called “digital natives.”<sup>5</sup> However, such a categorization is not appropriate in describing all our students, so such an expectation is bound to lead to disappointment.

In regards to achievement in their e-learning, most first-years’ were focused solely on completing the set requirement of HUSM and so did not realize they were not utilizing the ALC system to its intended full potential, and therefore actually underperforming. Indeed, this contention can be evidenced by **Table 2** showing that 75.0% of medical students and 81.1% of nursing students completing only the minimum set requirement of 10% progress (achieved in the 10.0 to 10.9% band) and only a very small percentage of students showed the initiative/motivation to challenge more units and expand their e-learning opportunity.

In addition, a 2016 survey of first-year students’ study habits at HUSM<sup>6</sup> described how the term “コストパフォーマンス” or “コスパ” (“cost-performance”) was frequently cited; that is, as first-years struggled to cope with the increasing pressures of university life and study, they compensated by making only the minimum necessary effort to simply pass their courses (平均 lowest passing grade = 60 to 69% of total points) rather than expending effort and time to achieve a better result. This also appears to be a factor in their approach to e-learning.

One of the HUSM stated goals is to prepare students for a globalized future medical career; however, only 28.6% of students responded that their e-learning experience was “useful for their future.” The students interviewed on this point sug-

gested that the very general nature of the e-learning content was a particular weakness and that including content on health-related topics or of a medical nature would have made their effort seem more relevant to their future careers as doctors.

With regard to the negative aspects of the students’ e-learning experiences, their responses reveal some glimmer of hope. A majority of responses indicated that accessing the e-learning system was “bothersome” (40.1%). Students commented about the e-learning requirement being layered over two of their medical English classes and therefore having no connection with what was being taught in the classroom. In addition, the periodic deadlines for the e-learning requirement were independent of class deadlines. The “bothersome” response also reflected the trouble some students had accessing the various course units via the technology they had available to them at any particular time. Examples included their smart phones not being adequate for speaking units and access times for the computer lab and library. In addition, 31.3% of students responded that e-learning was “difficult”; this may be attributed in part to students’ unfamiliarity with such a learning approach and its novel characteristics.

While only 16.1% of students responded that completing units was “boring,” an inspection of student learning records reveals that an overwhelming majority of students did only a small portion of those sections they chose to do, skipping those parts that they may have found less interesting and not doing the final evaluation tests. This approach could be attributed to what Hattie and Donoghue describe in one of their learning models as “surface learning” or “studying without much reflecting on either purpose or strategy.”<sup>7</sup> Thus, if the student’s main aim was to fulfill the minimum requirement with the least amount of energy expenditure, this is the approach they would take, a contention that can be evidenced by **Table 2**.

Finally, the small number of responses to “unnecessary for me” (i.e. below the students’ current level of ability) and “irrelevant to my needs” (i.e. the students considered the unit materials had no benefit for their future medical career), at 13.5% and 16.7% respectively, suggests that the majority of students did find some value in undertaking e-learning for both their language skills development and their future careers as medical professionals. Nevertheless, the substantive finding suggested here is that most HUSM medical and nursing students are underestimating the benefits of the current e-learning system and so are not making the best use of what it has to offer them.

Therefore, in order to improve the students’ overall expe-

rience with e-learning at HUSM, we believe the following proactive measures are required. Firstly, students need to be made more aware of how the blended learning approach can enhance their learning experience as well as boost their language skills acquisition. It may be that the many distractions of commencing university life, as well as their unfamiliarity with the autonomy required in a blended learning approach, are overwhelming students who then opt for merely meeting the minimum requirements determined by the university. In addition, a greater emphasis by the university on promoting the concept of e-learning as a helpful means of aiding students in language skills acquisition should be implemented. This is especially necessary as the university itself puts greater emphasis on its efforts to prepare the students for a career in more globalized medicine. Finally, the e-learning requirement should be de-coupled from the medical English subjects and be established as a credit-earning unit on its own. This would clearly communicate to all students that the e-learning requirement is valuable and has a distinct purpose in their study programs.

## 5. Conclusion

This paper examined how the current intake of HUSM first-year medical and nursing students has managed their e-learning study requirement and their perceptions of the program. The findings of this preliminary survey indicate that a majority of these students are not taking full advantage of the opportunities presented by the inclusion of e-learning in their English course programs and that they are more focused on short-term outcomes. Now, after nine years of e-learning at HUSM and observing the changing nature of medical and nursing students and their interactions with ICT

and e-learning, the authors feel there is a pressing need to sharpen this focus on blended learning by pursuing proactive measures to engage students more widely in e-learning achievement and encourage greater interest in better performance.

No funding was used for this research. The authors have no conflicts of interest to declare. Kabushikigaisha ALC Nagoya branch (株式会社アルク 名古屋支店) was asked to provide data that was relevant to this study but declined on the grounds of “personal information protection.”

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## Appendix 1

## On-line survey on ALC NetAcademyNext usage

**i1. Using the ALC e-learning course helped me to improve my English reading skills.**

ALC e-ラーニングを使って学習して、英語のリーディングスキルが上がった。

strongly disagree	disagree	agree	strongly agree
全くそうは思わない	そうは思わない	そう思う	強くそう思う

**i2. Using the ALC e-learning course helped me to improve my English writing skills.**

ALC e-ラーニングを使って学習して、英語のライティングスキルが上がった。

strongly disagree	disagree	agree	strongly agree
全くそうは思わない	そうは思わない	そう思う	強くそう思う

**i3. Using the ALC e-learning course helped me to improve my English listening skills.**

ALC e-ラーニングを使って学習して、英語のリスニングスキルが上がった。

strongly disagree	disagree	agree	strongly agree
全くそうは思わない	そうは思わない	そう思う	強くそう思う

**i4. Using the ALC e-learning course helped me to improve my English speaking skills.**

ALC e-ラーニングを使って学習して、英語のスピーキングスキルが上がった。

strongly disagree	disagree	agree	strongly agree
全くそうは思わない	そうは思わない	そう思う	強くそう思う

**i5. I thought ALC e-learning course was: (check all that apply)**

ALC e-ラーニングは (当てはまるものをすべて選択)

Interesting 面白かった  
 Enjoyable 楽しかった  
 Challenging やりがいがあった  
 Motivating 学習してモチベーションが上がった  
 Useful for my future 将来に役立つと思った

**i6. I thought ALC e-learning course was: (check all that apply)**

ALC e-ラーニングは (当てはまるものをすべて選択)

Difficult 難しかった  
 Boring つまらなかった  
 Unnecessary for me 必要ないと思った  
 Bothersome 面倒だった  
 Irrelevant to my needs 自分のニーズに合わなかった

**i7. If this e-learning course was available, but not required by HUSM, would you still login and use it to study?**

もしこのe-ラーニングが必須でなかったとしても、ログインして学習しますか？

YES	NO
学習すると思う	学習しないと思う

**i8. Where/how did you access the ALC e-learning course: (check all that apply)**

ALC e-ラーニングはどこで/どのようにアクセスしましたか？ (当てはまるものをすべて選択)

Computer lab 情報処理実習室  
 Library computer 図書館のコンピュータ  
 Other computers on campus 学内のその他のコンピュータ  
 Home computer wireless network on campus 自宅のコンピュータ学内Wi-Fi  
 Mobile phone/ smart devices 携帯端末 (スマホなど)

# Japanese pharmaceutical students' attitudes toward learning English technical terms with smartphone applications

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In this paper, we discuss the use of the smartphone for teaching and learning technical terminology from the student's perspective. Two surveys were conducted at two private pharmaceutical universities in order to discover student attitudes toward the acquisition of technical terms and the use of smartphone applications. A well-known application from the United States, Quizlet, was introduced to 2nd- and 3rd-year students and a Japanese application called Zuknow was introduced to 1st-year students. The results showed that 1) many students appreciate learning technical terms; 2) the benefits of using smartphone applications include handiness, efficiency and being enjoyable; and 3) problems with the use of such applications include the preference for paper-based learning, lack of Wi-Fi availability, and not knowing how to use the application. Our findings suggest that teachers should recognize differences in student learning styles and integrate in-class activities and self-study activities to enhance student motivation to use such applications.

*J Med Eng Educ* (2017) 16(3): 75–81

**Keywords** technical terms, pharmaceutical sciences, smartphone applications, student attitudes

## 1. Introduction

Information and Communication Technology (ICT) has drastically changed education over the last decade. As the well-known vocabulary acquisition scholar Nation points out "computer-assisted vocabulary learning is quickly becoming a misnomer as programs are available on smartphone, iPad and iPod" (p. 145).<sup>1</sup> Today, as most university students have smartphones, applications for such devices to learn English vocabulary need to be considered. Moreover, at least six encounters through reading are usually required to remember new words in a foreign language.<sup>2-5</sup> Thus, in-class activities are not sufficient and self-study is necessary in order to master a large vocabulary of technical terms. Whether vocabulary learning is incidental or intentional, repetition is required.

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In this paper, we discuss the use of smartphone applications for learning technical terms for pharmacy at two private universities. We developed teaching materials to help Japanese pharmaceutical students learn three types of English terminology: 1) technical terms derived from classical Greek or Latin (e.g., *dorsalgia*, "back pain": dors(o)-, "back" + -algia, "pain"), 2) sub-technical terms with multiple senses that have special technical meanings (e.g., *topical* in "topical anesthesia" and "topical issue"), and 3) layperson's terms often used by the general public (e.g., *hay fever* and *pollen allergy* instead of *pollinosis*). We had tested the use of the technical terms and layperson's terms in classes in 2016, and found the materials to be effective, with the teaching of affixes to be especially useful for understanding the meanings of unknown words.<sup>6,7</sup> At the end of the semester, we conducted surveys on student attitudes toward learning these technical terms.

### 1.1. Applications

Two smartphone applications used by the participants of this study are introduced here with explanations of why they were chosen for student self-study. First, both applications were free to download, which was important because we



wanted as many students as possible to use them. However, the use of the applications was optional because free Wi-Fi was not available at either university, and not all students had smartphones and/or mobile devices. Second, both applications were quite simple to use. Third, these two applications allowed the teachers to view student progress by monitoring student logs. This was useful for class management: for example, the teachers could encourage students to use the applications if the logs indicated that they were not actively being used. Below, we summarize the basic features of the two applications as well as their shortcomings.

### 1.1.1. Quizlet

Quizlet is an on-line memorization tool developed in the United States, and its users can create sets of words or phrases customized for their own purposes, which can be shared with other users.<sup>8</sup> The users can access the study sets using several modes such as “Flashcards” to memorize the Japanese translations and “Speller” to practice dictation (listen to the pronunciation and spell it out). One study mode called “Gravity” is like a computer game: asteroids containing words fall down the screen one by one and the user must type the appropriate Japanese translation before each asteroid reaches the bottom of the screen, as shown in **Figure 1**. The user can enjoy using different study modes and learn new words. In 2016, the website was only available in English, but as of 2017, there is a Japanese version. Another advantage of Quizlet is that it can be used from a computer as well as a smartphone.

In November 2015, Quizlet had over 100 million flashcard sets created by its users and there were more than 40 million monthly visitors. It is an excellent self-study tool for learning vocabulary, yet there are at least two shortcomings for teaching technical terms. First, the flashcards do not have multiple layers, so an example sentence cannot be added to a word

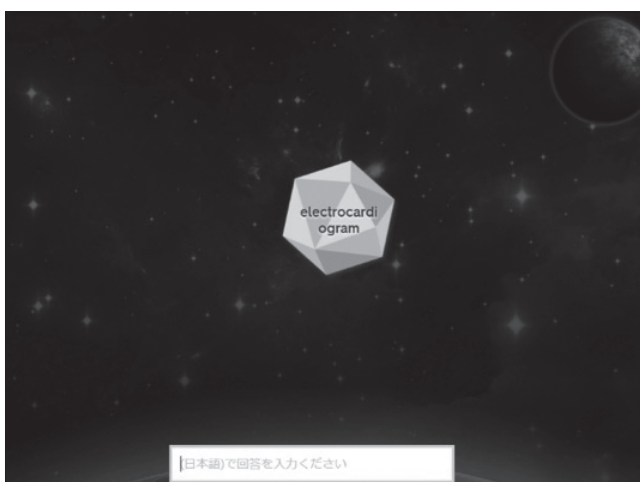


Figure 1. Screenshot of “gravity” mode from Quizlet.

entry. The other is that while Quizlet is supported by a text-to-speech audio function, many of the technical words are not pronounced correctly. Using the upgraded versions Quizlet Plus or Quizlet Teachers allows voice recording, but not all teachers can properly pronounce difficult technical terms.

### 1.1.2. Zuknow

Zuknow, developed by a Japanese company, was released in January 2014, and the application was downloaded over two million times and more than 20,000 contents were created by the end of that year. Unfortunately, it was discontinued in the spring of 2017. Its application was free to download and allowed the creation of learning sets. It had a flashcard function and was simple and easy to use. Users could see their progress by checking their study logs and the achievement ranking was posted for the group/class members, which can help motivate some users. Teachers could also view the study log of each student and send feedback or reminders by email. Although it has been discontinued, its features are introduced at a website, Zuknow Blog.<sup>9</sup>

The advantage of Zuknow was that its flashcards that had multiple layers and a word entry could contain not just the translation of the word, but an example sentence, picture, and some additional explanations. For the pronunciation of the words, like Quizlet, it only had a text-to-speech audio function. Zuknow did not have fancy games like Quizlet, but had a more elaborate flashcard function and provided more information that was useful for vocabulary learning. This is important because simply giving the Japanese translation of a term is not sufficient for grasping the fundamental sense of a word.<sup>10</sup> Another advantage of Zuknow was that teachers could easily send messages to their students including *emoji* and/or short text by simply choosing an appropriate message from a selection, thus greatly lessening the burden of the teacher.



Figure 2. Screen shot of ZuKnow.



## 2. Methods

### 2.1. English courses

The English courses involved in this study were for 1st-, 2nd-, 3rd-year students at two private pharmaceutical universities. The main contents of the courses differed; for example, the 1st-year course was for English reading and the 2nd-year course was for English speaking. However, all courses had a section dedicated to teaching technical terms. In the 1st year, layperson's terms were taught, and for the 2nd- and 3rd-year students, more technical terms derived from classical Latin and Greek were taught.

In both spring and fall 2016, Quizlet was introduced to 2nd- and 3rd-year students, and in fall 2016, Zuknow was introduced to 1st-year students. At the end of each semester, the participants responded to a questionnaire on learning technical terms and the use of the application. As mentioned earlier, as we wanted to include example sentences in the student self-study exercises, Zuknow was chosen as a supplementary tool for the layperson's terms. As the layperson terminology list consisted of ordinary words, almost all the words and sentences were correctly read by the text-to-speech audio system. In 2017, no particular smartphone application was recommended to the classes at one university because free Wi-Fi will not be available until spring 2018. Also, as preparation for more extensive use of ICT, we wanted to learn about student preferences with respect to smartphone applications and included more questions in the questionnaire,<sup>11</sup> but only the relevant items are discussed in this paper. In addition, we conducted pre-/post-tests to check on student learning, and significant differences were found in all courses.<sup>7,12</sup>

**Table 1. Questionnaire 1.**

Q1	Were the technical terms difficult for you?
Q2	Do you think that knowledge of the technical terms you learned will be useful for learning English in the future?
Q3	Do you think that knowledge of the technical terms that you learned will be useful when studying other subjects in pharmaceutical sciences in the future?
Q4	Would you like to learn more technical terms?
Q5	How often did you use the smartphone application?
Q6	Was the application useful for your learning?
Q7	If you chose 'didn't use much' or 'seldom used' for Q5, why didn't you use the application (much)?
Q8	Any other comments?

### 2.2. Questionnaires and participants

We conducted two kinds of surveys in this study. The first questionnaire was given at the end of each semester in 2016 to students of the English courses in which the technical terms were taught and the use of the smartphone applications was optional. The objective was to examine student attitudes towards the learning of the technical terms and the use of smartphone applications (see **Table 1**). A total of 345 students participated in this study and the breakdown of the participants is shown in **Table 2**.

The second questionnaire was given at the end of the spring semester in 2017 to the students of the English courses in which the technical terms were taught but no specific smartphone application was recommended. This was done to discover student preferences regarding the use of applications and their experiences with them (see **Table 3**). There were 133 respondents for the second survey and the breakdown of the participants is listed in **Table 4**.

## 3. Results

### 3.1. Survey 1

The results of Q1 through Q4 for all the participants are combined to reveal general tendencies. Q5 and Q6 responses were classified into Zuknow users (1st-year) and Quizlet users (2nd- and 3rd-year), with the chi-squared test used to evaluate the results. As no significant difference was noted, only the combined data are presented here.

First, almost 70% of the participants responded that the technical terms were difficult to some degree (**Table 5**).

Second, over 90% of the participants thought the learning of the technical terms would help their studies for English as

**Table 2. Participants in 2016 (n = 345).**

1st-year students	72
2nd-year students	100
3rd-year students	163

**Table 3. Questionnaire 2.**

Q1	Would you like to use a smartphone application for learning technical terms?
Q2	If yes, why do you think so?
Q3	If no or I don't know, why do you think so?
Q4	Have you used any kind of smartphone applications for your studies?
Q5	If yes, what kind was it?

**Table 4. Participants in spring 2017 (n = 133).**

1st-year students	63
2nd-year students	70

well as other subjects in pharmaceutical sciences in the future, as shown in **Tables 6** and **7**, respectively.

The third finding was that about 75% of the participants wanted to learn more technical terms (**Table 8**).

As for Q5, about 40% used the application to various degrees, as shown in **Table 9**. Similarly, about 40% of the participants found the application to be useful (**Table 10**).

Q7 and Q8 were open-ended questions. Q7 asked why some participants did not use the application frequently; the responses are presented in **Table 11**. With Q8, we found some positive feedback about the applications, as shown in **Table 12**.

### 3.2. Survey 2

Survey 2 was carried out because we felt the need to know more about student perspectives with respect to smartphone applications after examining the results of Survey 1. As stated above, Wi-Fi will not become available at one of the universities until 2018, so no smartphone application was recommended to the students and they were only asked to

respond to the questionnaire at the end of the semester.

For Q1, about 50% of the participants answered that they would like to use smartphone applications for learning technical terms, while about 24% answered that they would not (**Table 13**).

The positive views on smartphone applications, given in response to Q2, are shown in **Table 14**.

Q3 asked why some participants did not want to use smartphone applications. The responses are given in **Table 15**.

Q4 asked if the participants had previously used any educational applications for studying. Among 133 participants, 59 (44.4%) had tried applications (**Table 16**). As quite a few participants had had experiences with such applications, we compared the responses to Q4 with those to Q1. Among those who had had experience, 37 participants (62.7%) gave positive answers, 15 (25.4%) were uncertain, and 7 (11.9%) gave negative responses. Among participants without experience with educational applications, 30 (40.5%) gave positive answers, 19 (25.7%) were uncertain, and 25 (33.8%) gave

**Table 5. Q1: Difficulty of the technical terms (n = 345).**

	n	%
Difficult	77	22.3
Somewhat difficult	160	46.4
Neither	102	29.6
Somewhat easy	4	1.2
Easy	2	0.6

**Table 6. Q2: Usefulness for English learning (n = 345).**

	n	%
Agree	194	56.2
Agree a little	129	37.4
Neither	18	5.2
Disagree a little	2	0.6
Disagree	1	0.3
No response	1	0.3

**Table 7. Q3: Usefulness for other subjects in pharmaceutical sciences (n = 345).**

	n	%
Agree	210	60.9
Agree a little	104	30.1
Neither	23	6.7
Disagree a little	7	2.9
Disagree	1	0.3

**Table 8. Q4: Want to learn more technical terms (n = 345).**

	n	%
Agree	107	31.0
Agree a little	153	44.3
Neither	62	18.0
Disagree a little	18	5.2
Disagree	4	1.2
No response	1	0.3

**Table 9. Q5: Frequency of application use (n = 345).**

	n	%
Often used	62	18.0
Used sometimes	38	11.0
Used occasionally	39	11.3
Did not use much	72	20.9
Seldom used	132	38.3
No response	2	0.6

**Table 10. Q6: Usefulness of the application.**

	n	%
Agree	84	24.3
Agree a little	51	14.8
Neither	101	29.3
Disagree a little	53	15.4
Disagree	39	11.3
No response	17	4.9

negative responses. There was a significant association between the answers of Q4 and Q1 (Pearson's chi-squared = 9.7593, DF = 2, p = 0.00<0.01; likelihood ratio = 10.2499, DF = 2, p = 0.00<0.01).

For the responses to Q5, the most frequently mentioned were those for studying English for college entrance exams, such as *target 1900* and others from Toshin, a major preparatory school in Japan.

**Table 11. Q7: Negative comments on the use of smartphones.**

	n
A) Prefer to study with paper materials	67
B) Not interested in e-learning	16
C) Hard to study with the smartphone	35
D) Did not know how to use the application	31
E) Started playing with other apps like games or disturbed by LINE communication	4
F) Worried about battery level	3
G) Cannot use it when due to cap on access amount	3
H) Did not want to pay for the data transfer	2
I) Did not have enough storage to download the app.	1
J) Too lazy to download the program	1
K) Could not log in to installed app	1
L) Did not want show my ranking to other group members	2

**Table 12. Q8: Additional comments.**

	n
A) Convenient to study on the train/bus	5
B) Handy	2
C) I can use it whenever I have a little spare time	2
D) Repetitive practice is very useful	1
E) It teaches the words well	1
F) I can learn visually and aurally	1
G) Good to be able to check the pronunciation	1
H) It was easier to study with Quizlet on the PC than my smartphone	1

**Table 13. Q1: Want to try smartphone applications for technical vocabulary study (n = 133).**

	n	%
Agree	25	18.8
Agree a little	42	31.6
Neither	34	25.6
Disagree a little	17	12.8
Disagree	15	11.3

## 4. Discussion

In this study, we taught technical terms in English classes at two pharmaceutical universities, with a smartphone application, Quizlet or Zuknow, being used as an optional learning tool. Survey 1 was conducted to learn about student attitudes toward the acquisition of the technical terms and the use of the applications. First, almost all the participants appreciated learning technical terminology not just for English per se (Q2: **Table 6**), but also for their specialized studies (Q3:

**Table 14. Q2: Positive views on the use of applications.**

	n
Can use anytime anywhere I want	22
Handy, convenient, have the smartphone with me all the time	18
Fun, interesting	5
Efficient	4
Want to study more	3
Can listen to the sounds	2
Useful	2
Love the smartphone	2
Do not have to make own flashcards	1
It motivates me	1

**Table 15. Q3: Negative views on smartphone applications.**

	n
A) No Wi-Fi available on campus	13
B) Data transfer limitation	5
C) Battery charging problem	5
D) Writing the words is important	8
E) Prefer paper based materials	3
F) Eyestrain	2
G) Not good with IT	2
H) Not interested, don't want to try	5
I) Don't know	6
J) Other reason	2

**Table 16. Q1 responses according to Q4 responses, prior use of educational applications.**

Q4	n	Q1: Want to try apps	n	%
Have used application before	59	Agree or agree a little	37	62.7
		Neither	15	25.4
		Disagree or disagree a little	7	11.9
Never used application before	74	Agree or agree a little	30	40.5
		Neither	19	25.7
		Disagree or disagree a little	25	33.8

**Table 7**). Many English technical terms exist as loanwords in Japanese and the students should be able to benefit from their knowledge of specialized terminology. Also, many participants (about 75%) wanted to learn more technical terms (Q4: **Table 8**), which implies that they understood their importance.

As for the frequency of application usage, less than half of the participants used the applications (Q5: **Table 9**). A similar number of the participants found them useful (Q6: **Table 10**). Better results may have been possible if free Wi-Fi had been available on campus.

Q7 asked why more than 50% participants did not use the application (much). As can be seen from the answers in **Table 11**, one common response was related to learning style: there was a preference for non-digital study using paper (A: 19%) or not being interested in e-learning (B: 5%). Another common answer was difficulty using the smartphone (C: 10%). While details were not available for this response, it may be that digital devices have many distractions in the form of games and SNS communications (as described in answer E).

About 9% of the participants stated that they did not know how to use the application (D). This kind of technical problem can be solved with more support from the teachers. In this study, the teachers helped the participants download the program and register, and then showed how to use the program in class at least once and in some classes twice. This much instruction was probably enough for most participants, but it seems that some required even more detailed support.

Other comments included more technical concerns or problems (F through I). It should be noted here again that neither university had free Wi-Fi on campus. One university will start providing Wi-Fi in 2018, and we would like to conduct a study to find whether this will lead to more active use of smartphone applications.

With Q9, we received positive comments on the applications as listed on **Table 12**. These users were aware of the benefits of studying via smartphone applications. One of the main reasons for recommending smartphone applications is the availability of multimedia resources, including audio. Exposing students to the sounds of the words and sentences as much as possible should help them acquire good pronunciation and listening ability. It was interesting to find that one participant stated a preference for using the PC over the smartphone. This comment agrees with Stockwell's finding that problems with mobile phones are cost, noisy surroundings and the small screen, with some learners using PCs more often for learning than mobile phones.<sup>13</sup> Of course, the portability of smartphones is likely to have led to their choice

by many participants.

Survey 2 was carried out to discover student preferences about the use of educational applications and their experiences with them. About 50% of the participants would like to use applications for learning technical terms (Q1: **Table 13**). Among them, the "handiness" of the smartphone applications was mentioned as the reason they would like to use the application (Q2: **Table 14**). Thirteen participants mentioned using it while commuting to university by train. Others mentioned further advantages of smartphone applications, such as pleasure and efficiency. Two participants specifically stated the benefit of being able to listen to the pronunciation of the words.

Of those who did not show interest in applications, the main concerns were circumstantial: Wi-Fi and battery charging (**Table 15**: A, B, & C). Another concern was personal learning style: some prefer studying with paper and pencil rather than digitalized materials. Such student types were also found with Q7 of Survey 1.

Finally, we compared the responses to Q4 with those to Q1 (**Table 16**). Overall, participants with experience were more positive about educational smartphone applications for technical vocabulary learning. This suggests that having experience with educational applications may help the user to become more positive about their usage in general and better understand the benefits of their use.

## 5. Conclusion

This paper presents the results of two surveys taken to reveal student attitudes towards learning with smartphone applications. Although the applications had their shortcomings, their benefits were substantial and were recognized by the participants. In order to raise motivation, students should be made aware of these advantages and be given proper guidance and support at the start of usage. Wi-Fi availability is also essential for using such applications in class. Another important point is teacher feedback and communication with the students to help them maintain motivation. Of course, paper-based learning should not be discouraged. Diverse modes of studying should be complementary and be of benefit to both teachers and students. What is most important is that the teacher be sensitive to and aware of student needs and preferences for creating optimal learning environments.

## Acknowledgments

We are grateful to the Ministry of Education for funding our project with JSPS KAKENHI Grant Number 26350206.

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# Meet JANET – The Japan Association for Nursing English Teaching (全国看護英語教育学会)

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This paper details the formation, development, organization and objectives of JANET – The Japan Association for Nursing English Teaching (全国看護英語教育学会) – a professional association for teachers of nursing English. Over the past decade, despite considerable growth in the number of nursing schools and universities in Japan, and the consequential increase in the number of English teachers, there have been few opportunities for teachers of nursing English to be part of a collaborative community. JANET aims to provide such a forum, with a view to improving the quality of teaching, learning, and research in the field of nursing English education. Our long-term goals include holding an annual conference, the development of a nationally recognized core curriculum and ENP proficiency test.

*J Med Eng Educ (2017) 16(3): 83–85*

**Keywords** Nursing English, teaching association

## 1. Background

Japan has experienced considerable growth in the field of nursing education. In the period 2007-16 alone, 134 new schools with an increased enrolment capacity of 47,577 were created,<sup>1</sup> and almost all nursing colleges and universities include English in their curriculum. Surveys of Japanese nurses have revealed an increasing demand for English skills, and that these nurses feel stressed by this demand and unsatisfied with the education they received in college or

university.<sup>2</sup> For practicing nurses, competence in English requires both formal medical English knowledge as well as the ability to speak and comprehend informal English.<sup>3</sup> To address these complex needs, many nursing colleges and universities have hired English teachers, often native English speakers, but these instructors often lack experience in their students' chosen field.<sup>4,5</sup> Moreover, they often must operate in isolation,<sup>6</sup> without professional support and unable to enjoy the benefits of collaboration, such as those experienced by medical English-teaching members of JASMEE.

To address this lack of a support network, and with a desire to promote and enhance the quality of nursing students' English language education, in December 2016, the Japan Association for Nursing English Teaching (JANET) was established. JANET aims to provide a forum for improving the quality of teaching, learning and research in the field of nursing English education in Japan. We aim to encourage collaboration between English teachers and nursing professionals, and support teachers to better serve the needs of the Japanese nursing community.

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Elements of this paper were delivered as part of a poster presentation at the JALT PanSIG Conference, Akita International University, May 21st, 2017

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## 2. Stages of development

Plans to establish a nursing English association had been informally discussed at language teaching conferences in

Japan over a number of years; however a concrete plan to create JANET was not reached until July 2016. The first goal of the founders was to engineer a gathering of kindred spirits, and it was felt that coordinating a nursing English round-table at the 2016 JALT International language teachers' conference would provide a suitable starting point. Through talking with attendees and by word of mouth, we ascertained a clear need for such an organization, and were able to make a commitment to the next stage, which involved the creation of two websites: a public 'landing' site to introduce the organization and serve as a portal for new members, and a private site housing a forum for discussion, a repository of links to nursing English related articles and research papers (currently listing 74 English papers and 17 Japanese articles), along with other resources and an archive of back numbers of our newsletter.

At this time we were also engaged in researching organizations with similar aims and operations, among them JASMEE, The European Association for Language Teaching for Healthcare (EALTHY), and The Japan Association for Self-Access Learning (JASAL). We then set about spreading the word through email and social networks, by word of mouth, and by conference attendance. Next we began recruiting volunteers and establishing an executive committee.

### 3. Adding value and creating buy-in

Although JANET charges no fees – and has no plans to introduce fee-based membership – we recognize that the success of this venture will largely depend on how much genuine engagement we can generate among our members. While we hope to utilize the website as a forum for member involvement, we also need to have a regular, visible reminder of our presence. To this end, we publish a monthly newsletter (sent to members via email) and from September 2017 will produce a semi-annual e-magazine – Nursing English Nexus – in order to provide a record of JANET members' activities and an opportunity for members to share their experience and expertise. The first issue of Nursing English Nexus has ISSN accreditation and deals with international study programs for nursing students. The website also will enable members to connect with others who share their particular area of interest or concern.

### 4. Potential pitfalls

Besides promoting interest in JANET, we also need to safeguard against possible pitfalls that could jeopardize JANET's growth and effectiveness. Among these we have identified

and seek to avoid the following:

- An over-reliance on the founders – we need to share the load and recruit more volunteers for executive posts.
- Failure to provide and update content on our websites and in our publications.
- Failure to generate traffic to our websites and newsletters.
- Failure to be inclusive. Our operating language is English, but we need to ensure that JANET is an attractive proposition to all Japan-based teachers of nursing English, not just to appeal to native speakers of English. To this end we need to provide as much bilingual content as possible.
- Risk of losing momentum within the executive committee. We can avoid this by holding regularly scheduled Skype conferences. While email communication is constant, meetings are currently held once a month. This may need to be increased.

## 5. Positions & job descriptions

As mentioned above, the recruitment of volunteers was a key stage in JANET's development. With the creation of an executive committee and a publications committee, the management of JANET is an increasingly collaborative undertaking. We have created and filled the following positions:

- Coordinator – responsible for maintaining overall continuity; providing general strategy and officer support;
- Membership Chair – responsible for member recruitment and general outreach;
- Program Chair – responsible for symposium planning and other conference-related activities;
- Publications Chairs – responsible for the formatting and dissemination of e-magazine, newsletters, publicity materials;
- e-Magazine Editor – responsible for assembling content for JANET's bi-annual e-Magazine;
- Newsletter Editor – responsible for assembling content for JANET's monthly newsletter;
- Webmaster – responsible for the maintenance of our websites;
- Liaison Officers – responsible for establishing and promoting JANET's relationships with bodies such as Japanese Nursing Association (JNA), Japan Association of Nursing Programs in Universities (JANPU) and JASMEE.

## 6. Areas of interest

We are keen to support members' research activities and

grant applications by bringing people together and providing resources, information, and materials. We are currently planning to apply for a grant-in-aid from the Japan Society for the Promotion of Science to carry out a comprehensive needs analysis of nursing English in Japan, with a view to working towards an approved core curriculum and, ultimately, the creation of a national English for nursing purposes (ENP) proficiency test, as JASMEE has done for English for medical purposes (EMP).<sup>7</sup>

But our members' interests cover a wide range, among them:

- Testing and assessment for nursing English
- Benchmarking nursing English programs
- Nursing English goals and 'can-do' statements
- Intercultural and transcultural nursing communication
- Nursing study abroad programs
- International exchange for nursing students
- Nursing English research
- Materials development for nursing English

## 7. The future

Ultimately we aim to transition from being a volunteer-based organization to an officially recognized academic society that can provide recognized standards and generally help to improve the quality of nursing English teaching and learning in Japan. Our future aims are:

1. to enhance the quality and effectiveness of nursing English education in Japan by sharing best practices and developing curriculum guidelines, as JASMEE has done for medical English education in Japan<sup>8</sup>;
2. to provide a supportive online and offline community for nursing English teachers;
3. to provide a repository for nursing English teaching resources, materials and information;
4. to provide a forum for nursing English discussion, collaboration and research;
5. to hold an annual JANET symposium / conference;
6. to create a nationally recognized ENP proficiency test focusing on spoken interaction.

## 8. Our plea

We welcome suggestions and advice about JANET's future directions and growth. If you have any friends or colleagues who are involved in nursing English education, please tell them about JANET, and ask them to visit our website or contact us at <janetorg.com@gmail.com>

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JANET Co-founder, Coordinator and Membership Chair. Has been teaching nursing English at the Japanese Red Cross Hiroshima College of Nursing since 2004. Author of nursing English courses *Bedside Manner & Bedside Manner Beginner* (Perceptia Press). Besides nursing English, interested in materials development and intercultural communication.

#### Mathew Porter

JANET Co-founder, Publications Chair and Webmaster. Entered the field of nursing English in 2015, but has taught in general English programs for 15 years. Interested in listening, reflection, self-directed learning and CEFR-based curriculum design.

#### Ian Willey

JANET Liaison Officer. Has taught medical, nursing, and general English mainly to medical and nursing students at Kagawa University since 2005. Author of *Easy Nursing English* (Nanzando) and the principal investigator of two *kaken* grants, which have explored the practices of medical English editors and the English needs of doctors and nurses in rural Japan.

# Introducing EAMET (The East Asian Association of Medical English Teachers)

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*J Med Eng Educ* (2017) 16(3): 86–87

## 1. Background

Allow me to introduce a new academic organization, The East Asian Association of Medical English Teachers (EAMET), an organization that will likely be of interest to JMEE readers and JASMEE members. Readers of the JMEE Journal will naturally be familiar with the JASMEE organization. JASMEE serves to promote the teaching and learning of medical English within Japan, with particular concern for the institutions, culture, and both social and pedagogical clinical practices that exist in Japan. However, there appears to be no other such national organization in East Asia, meaning that there is no hub or organization which can serve as a unifying force or as a promoter of advancing Medical English education in the region.

During past research trips to hospitals and universities throughout East Asia I was often told by both language instructors and in-service health professionals that, in terms of specialist English development, they felt isolated from their peers in other countries and hoped for greater interactions, particularly within the region, and without being dependent upon Anglo-American norms and standards. And this is why I began to develop an interest in creating and coordinating EAMET.

## 2. Goals and purposes

EAMET is an academic association that has been established as of the summer of 2017. The aim of EAMET is to establish a multi-national, multi-disciplinary organization

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which shares an interest in sharing and developing the quality of medical English teaching and learning in the East Asian region.

Our goal is to create a hub and resource center (based at the University of Miyazaki) from which practitioners and educators who become members can submit and retrieve classroom materials, research papers, engage in collaborative ideas and requests online, with future goals of producing a regular newsletter and, eventually, hosting a small specialized conference. We also plan to continually expand our website.

But why 'East Asia'? We believe that this part of the world shares certain defining cultural and linguistic features which impact both the nature of language pedagogy and medical education. While the region manifests the notion of unity in diversity, it also sets itself apart as distinct from other regions of the world. Rather than depend on Anglo-American models, EAMET seeks to unite medical English teachers in the region to collaborate with their peers using English to foster local management of our shared circumstances.

## 3. Scope

Outside Japan, we are trying to establish EAMET hubs within each country in the region. As of August 2017, we have established relations with Brawijaya University in Malang, Indonesia, and will very soon establish ties with two universities in Thailand, Prince of Songkla University in Hat Yai and Thammasat University in Bangkok, as well as National Cheng Kung University in Tainan, Taiwan. Gradually we also hope to establish local hubs in Vietnam, South Korea, mainland China, Malaysia, the Philippines, Cambodia, Laos, Mongolia, Singapore, and Myanmar. We encourage readers who have established medical English education contacts in those countries to get in touch with us.

## 4. Features

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The EAMET website can be found at <http://www.med.miyazaki-u.ac.jp/home/eamet/about/>.

In order to access or upload materials and to make contacts with others registering yourself as a member is required, but there is no cost. Once established as a member, we hope that you will contribute to our site with interesting links and uploads of content related to the topic of Medical English.

We hope that more and more educators will develop an interest and come to actively participate in this new organization. At some point in the future we plan to relinquish central control and allow the organization to become member

controlled and supported, with a multi-national set of facilitators.

The establishment of the EAMET organization is partially sponsored by a Scientific-In-Aid Grant provided by the Japanese Ministry of Education, Culture, Sports, Science and Technology. The project number is 17K02931.

Contact: Michael Guest <[michael@med.miyazaki-u.ac.jp](mailto:michael@med.miyazaki-u.ac.jp)>





## Dr. Saji in memoriam

We at JASMEE lost a good friend and colleague when Dr. Tsutomu (Ben) Saji passed away of pancreatic cancer on May 22 of this year. He was 67 years old. Dr. Saji will be remembered as a doctor who was caring towards his patients, global in his practice of medicine, and enthusiastic in helping other doctors and teachers in their careers, including English teachers.

Dr. Saji graduated from Toho University School of Medicine in 1976, and he passed his ECFMG, the certificate for foreign medical graduates in the US, the same year. This set the path for his lifelong involvement with hospitals and medical associations all over the world. Dr. Saji returned to Toho University Ohmori Hospital in 1978 and entered

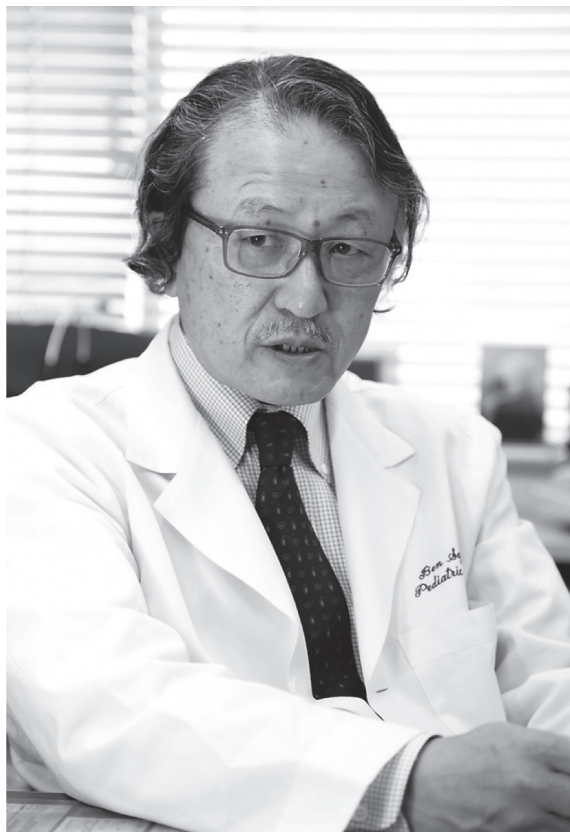


Photo courtesy of Toho University Medical Center Omori Hospital (Department of Pediatrics)

the pediatrics department, where he would teach and practice as a pediatric cardiologist specializing in Kawasaki disease until his retirement in 2016. Dr. Saji was also the recipient of an endowed chair from Actelion Pharmaceuticals Japan Ltd. to study pulmonary hypertension, his other specialty, and, after his retirement, he continued doing research through his endowment right up to his passing.

Dr. Saji was always encouraging students to study English and go abroad to advance their careers. As part of his pediatrics classes, he would teach the fourth-year students the basics of history-taking in English, and for the last nine years he recruited me to help in the final pediatrics class of each year. For several years, he also taught an elective course on the USMLE for students who were interested in studying or practicing overseas. Students said that Dr. Saji was a tough teacher, but that he obviously cared about their education. Dr. Saji was also in charge of the Toho University golf club, and the students in that club were devoted to him because of how well he looked after them.

Dr. Saji was a member of many medical associations, not only in Japan but internationally. Some of his significant memberships were in the Japanese Society of Pediatric Cardiology and Cardiac Surgery, the Japan Pediatric Society, and the Japanese Circulation Society, all of which he helped by serving on numerous committees. He was also a member of the American Heart Association, the Cardiovascular Disease in the Young Leadership Committee, and the World Heart Federation World Congress of Cardiology Scientific Program Committee. He was a Fellow of the Japanese Col-

lege of Cardiology, the Society of Cardiac Angiography and Interventions, the American College of Cardiology, and the American Heart Association.

At the time of his retirement, Dr. Saji had written or collaborated on over 600 papers and on 93 books, many of these in English. He also gave or participated in over 1200 presentations or symposiums. He continued to present and publish after his official retirement, so the real number is even higher. According to his secretary, Ms. Chiaki Goto, Dr. Saji rarely had a weekend when he was not at an academic meeting somewhere. Many of these meetings were overseas, and he spent a lot of time traveling. A few weeks before he passed away, Dr. Saji gave a one-hour presentation at a pediatric cardiology conference in San Francisco.

These are just the highlights of his career. Dr. Saji was involved in many other associations and groups all over the world, but, of course, we knew him best as a member of JASMEE. Dr. Saji was a councilor of JASMEE from 2001 to 2017, a board member from 2003 to 2014, a member of the EPEMP steering committee from 2006 to 2009, chair of the 2008 academic meeting, and finance manager from 2011 to 2014. Through JASMEE, he was always trying to encourage the use of English in medicine and inspire young doctors to go overseas to study.

People who knew Dr. Saji were always taken by his willingness to help and his caring for other people. On a personal note, Dr. Saji was always encouraging me in my work and also telling me to be more active in JASMEE. He would say, "Hey, you should apply to be a councilor in JASMEE," or, "Hey, you should give a presentation about your

work." (He always seemed to preface his advice with "Hey.") When I had to give some lessons on English for pediatrics, Dr. Saji recommended which topics I should use for the lessons, and he loaned me his copy of *Nelson Textbook of Pediatrics*. Then he told me which parts in the textbook were wrong. When Dr. Saji retired as a pediatrician in 2016, he moved into the office next to mine to continue his research. This allowed me to get to know him even better, for which I feel very fortunate.

His son, Mike, said that Dr. Saji liked to use the Louis Pasteur quote, "Chance favors the prepared mind," as his motto about work. He also said that when Dr. Saji saw a patient, he focused on the person, not the disease, and that he greatly cherished his relationship with his patients. One very touching story about Dr. Saji comes from his secretary, Ms. Chiaki Goto, in an article that she wrote for Dr. Saji's retirement. She said that Dr. Saji put a lot of importance in family, and when he talked with his wife, they sounded like newlyweds. When Ms. Goto's husband suddenly passed away, Dr. Saji cried with her to share her grief, and she was amazed that Dr. Saji, who was usually so calm, could show his emotions like that. She said that this depth of feeling was why he could devote himself so hard to his work.

Dr. Saji is survived by his wife, Nobuko, his son Mike, who is a cardiologist, his daughter, Rei, and four grandsons. We are truly saddened at his passing and give our condolences to his family.

**Alan Hauk**

Faulty of Medicine, Toho University

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**Journal of Medical English Education Vol.16 No.3**

日本医学英語教育学会誌

2017年10月1日発行 第16巻 第3号 頒価1部3,000円

編集人 ティモシー・D・ミントン

企画 日本医学英語教育学会

発行所 メジカルビュー社

〒162-0845 東京都新宿区市谷本村町 2-30

TEL 03-5228-2274 / FAX 03-5228-2062 / E-MAIL [jasmee@medicalview.co.jp](mailto:jasmee@medicalview.co.jp)

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