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# 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. 19, No. 1, February 2020

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## 第23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23回学術集会は下記により開催します。今回は、東京オリンピックの開催期間を考慮し、例年より1カ月程早い時期に、四国の高知で開催します。日本医学教育学会の委員会に起源をもつ本会に是非ご参加いただき、医学英語教育について情報を交換していただければと思います。

### 記

学会名：第23回日本医学英語教育学会学術集会

日 時：2020年6月27日（土）～28日（日）

会 長：高田 淳（高知大学医学部）

会 場：高知県民文化ホール（〒780-0870 高知県高知市本町4-3-30）

演題募集：2019年12月20日（金）～2020年2月21日（金）

（国際的交流活動、医療現場と医学英語、USMLE対策、医学英語達成度評価、医学英語教育における新たな取り組み、JASMEEの今とこれから、その他）

\*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 23rd 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 23rd JASMEE academic meeting is presented below. In consideration of the Tokyo 2020 Olympics, the meeting will be held at the end of June, one month earlier than usual, in Kochi, Shikoku. We look forward to welcoming JASMEE members and non-members alike to this meeting, where they will be able to share their experience and expertise with others in the field to the greater benefit of medical English education in Japan and beyond.

**Dates:** Saturday June 27 and Sunday June 28, 2020

**Venue:** Kochi Prefectural Culture Hall

4-3-30, Hon-machi, Kochi-shi, Kochi 780-0870

**President:** Jun Takata

(Kochi Medical School)

**Call for papers:** Proposals for papers on the following subjects (or similar) should be submitted  
by February 21, 2020.

- International Exchange Programs
- Medical English in Clinical Settings
- USMLE Preparation
- Evaluation of Proficiency in Medical English
- New Developments in Medical English Teaching
- JASMEE-Now and in the Future

Submissions will only be accepted from JASMEE members in good standing. To submit a proposal, please access the JASMEE homepage (<https://jasmee.jp/23rd-academic-meeting-2020-6-27-28/>).

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# Journal of Medical English Education

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医学英語習得の近道である「基本ステップ」と「基本表現」を身につけよう！

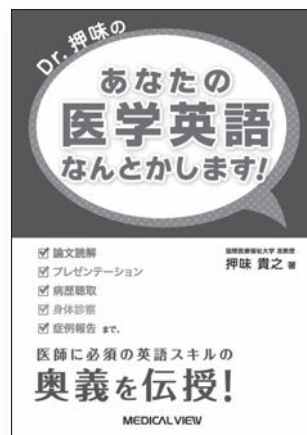
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# あなたの 医学英語 なんとかします！

著者

押味 貴之  
国際医療福祉大学 准教授

医師や医学生にとって本当に必要なのは「論文を読めるようになる」「国際学会で質疑応答ができるようになる」「外国人患者さんが満足できる医療面接ができるようになる」「海外の医師にもわかってもらえる症例報告ができる」という医学コミュニケーションができるようになることである。本書では医学英語教育分野の第一人者である押味貴之医師が、医師にとって必要最低限の医学英語スキルである「論文読解」「プレゼンテーション」「医療面接」「症例報告」という4つのスキルに関する奥義を余すことなく伝授する。「医学英語をなんとかしたいけど、どこから手をつけたらいいのかわからない」というあなたにこそ、ぜひ手に取ってほしい1冊である。



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A5 判・232 頁・2 色刷  
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目次	<b>Chapter 1 医学英語とは？</b>	<b>Chapter 3 プレゼンテーションの奥義</b>	4 医療面接の 10 のステップ
	1 医学英語 (医学英語教育) とは 2 医学英語の定義 3 医学英語学習を成功に導く "AID"	1 プレゼンテーションのポイント 2 プレゼンテーションのうまい進め方 3 質疑応答 (Q&A, Questions and Answers) プレゼンテーションの表現集	5 難しい質問に答えるための 5 つのステップ 医療面接の表現集 練習用症例シナリオ
	<b>Chapter 2 論文読解の奥義</b>	<b>Chapter 4 医療面接の奥義</b>	<b>Chapter 5 症例報告の奥義</b>
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受付や案内・予約・電話対応など、窓口での対応は病院の“顔”。スムーズな対応で窓口業務のスペシャリストになろう！

病院スタッフのための

# シチュエーション英会話

Situational Communication Skills for Hospital Staff

著者 服部 しのぶ 藤田保健衛生大学医療科学部 准教授 英文校閲 Chris Donaldson

グローバル化や医療ツーリズムの進展に伴い、日本語が不自由な在住外国人や外国人旅行者が日本の医療機関を利用する機会が増えている。受付や案内、会計、薬局等の病院職員がそうした状況に適切に対応できるように、外国人患者が日本の病院を訪れた際に考えられる種々の場面での英会話をロールプレイ形式で紹介。また、宗教や食文化など、異文化理解に役立つ知識をコラム形式で解説。音声ダウンロードサービス付き。



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	<b>Chapter 2 病院案内</b>	<b>Chapter 8 検査</b>	付録 2 受付での手続き	付録 8 病院で働くスタッフの名称
	<b>Chapter 3 電話対応</b>	<b>Chapter 9 薬局</b>	付録 3 各種書類の名称	付録 9 診療科と専門医の名称
	<b>Chapter 4 会計</b>	<b>Chapter 10 リハビリテーション</b>	付録 4 会計用語	付録 10 医療行為
	<b>Chapter 5 予約</b>	<b>Chapter 11 災害時の対応</b>	付録 5 薬局用語	付録 11 身体各部の名称
	<b>Chapter 6 入院生活</b>	<b>Chapter 12 避難所生活</b>	付録 6 医療器具の名称	

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# How does learner autonomy influence preparation for, and performance on the TOEFL ITP test?

Cosmin Mihail Florescu,<sup>1</sup> Yusuke Hayasaka (早坂裕介),<sup>1</sup> Mutsumi Inokawa (井之川睦美),<sup>1</sup> Takayuki Oshimi (押味貴之),<sup>2</sup> and James Rogers<sup>3</sup>

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**Background/Objectives.** Research carried out for the first cohort of medical students at the International University of Health and Welfare (IUHW) showed that test preparation in the classroom is only weakly correlated with score gains and not in the targeted test section, while out-of-class preparation showed no correlation with score improvement. In this paper we try to fill a gap in the previous report by looking at how learner autonomy affects the way students prepare for, and perform on the test.

**Methods.** Test-taking strategies were explicitly taught only to first year students (second cohort) choosing autonomously to attend an elective course aimed to prepare them for the TOEFL ITP test. All students ( $n=119$ ) were required to complete the same online preparation course and data was collected at four points in time to identify learners undertaking the assignment proactively. A correlation analysis was carried out involving 27 factors including test scores, online course progress, scores and time spent, as well as attendance in the elective course.

**Results.** We found a weak positive correlation ( $0.247$ ;  $p < 0.005$ ) between attendance and listening score improvement, and a weak negative correlation ( $-0.288$ ;  $p < 0.005$ ) between attendance and pre-program test scores. We found no significant correlation at any of the four points between the online course score, time spent or assignment progress and score gains.

**Conclusion.** The results indicate that students choosing autonomously to attend preparatory lessons can expect small gains in the targeted test section. Counterintuitively, more time spent studying autonomously was not correlated with improved performance on the test. We conclude that test-preparation can (at most) yield modest results for diligent learners who opt to take test-preparation classes.

*J Med Eng Educ(2020) 19(1): 5-13*

**Keywords** test preparation, language testing, TOEFL ITP, learner autonomy

## 1. Introduction

The English language education program for first-year students implemented at the International University of Health

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A summary of this paper was presented orally at the 22nd JASMEE Academic Meeting on August 4, 2019 in Tokyo.

and Welfare (IUHW) School of Medicine is in its third year and few modifications have been made with regard to its mandatory components (English I and English II; see our previous article for program details<sup>1</sup>). Additionally, students are still required to complete an online TOEFL preparation course (MyELT course), which allows them to practice test questions from the TOEFL reading and listening sections; the course is supposed to take up to 40 hours to complete and is made available for six months each year (from July to January). By contrast, English Communication (EC), the elective component of our program, has been completely overhauled with the explicit goal of providing students with the autonomy to choose between lessons delivered simultaneously on a variety of topics: Science, Medicine, Hobbies, World, English

for General Purposes, and English for Academic Purposes. The last topic included TOEFL ITP® test preparation lessons (prep-lessons).

It is important to point out that the English language education program has succeeded for two consecutive years in improving the students' average TOEFL scores by more than 30 points for the total score and four points for the listening score upon program completion (Figures 1, 2). Our school curriculum includes a mandatory overseas clinical clerkship during the fifth year; accordingly, it is extremely important for our learner to the range of destinations they can opt for when deciding where they would like to undertake the clerkship training.

A paired-samples t-test was conducted to compare Section 1, 2, 3 and total scores in April 2018 and January 2019 (see

our first paper<sup>1</sup> for the results of the same test applied to April 2017 versus January 2018 scores). There were significant differences in:

- Section 1 scores in April 2018 (M=49.34, SD=6.55), and January 2019 (M=53.34, SD=5.87);  $t(135)=-13.31, p < 0.001$ ;
- Section 2 scores in April 2018 (M=51.54, SD=6.16), and January 2019 (M=54.59, SD=5.35);  $t(135)=-8.35, p < 0.001$ ;
- Section 3 scores in April 2018 (M=52.52, SD=6.18), and January 2019 (M=55.27, SD=4.78);  $t(135)=-7.78, p < 0.001$ ;
- Total scores in April 2018 (M=511.32, SD=55.82), and January 2019 (M=543.99, SD=48.25);  $t(135)=-13.48, p < 0.001$ .

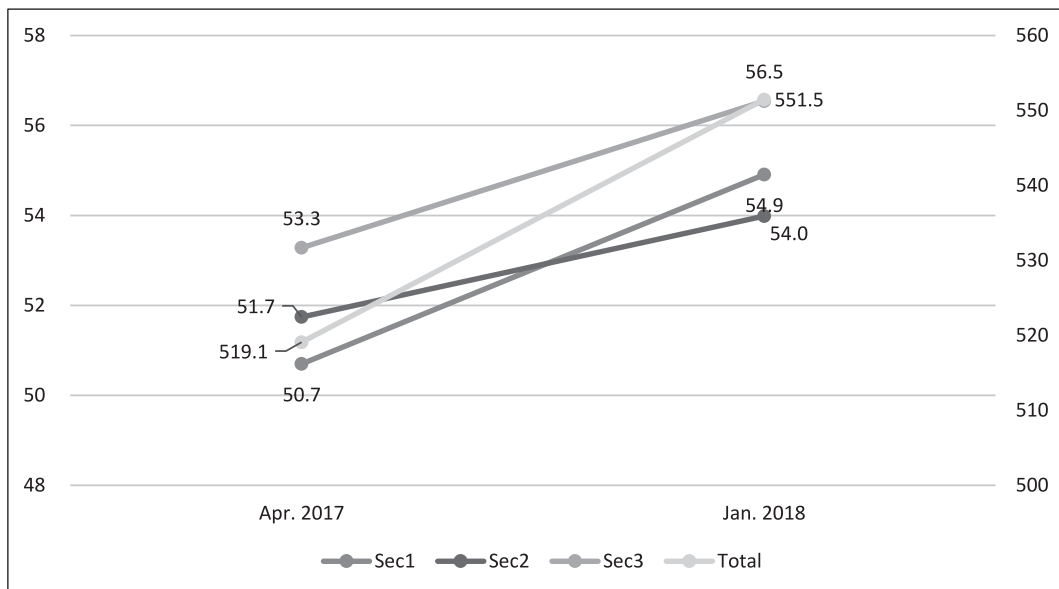


Figure 1. TOEFL ITP® score gains for the first cohort of IUHW medical students

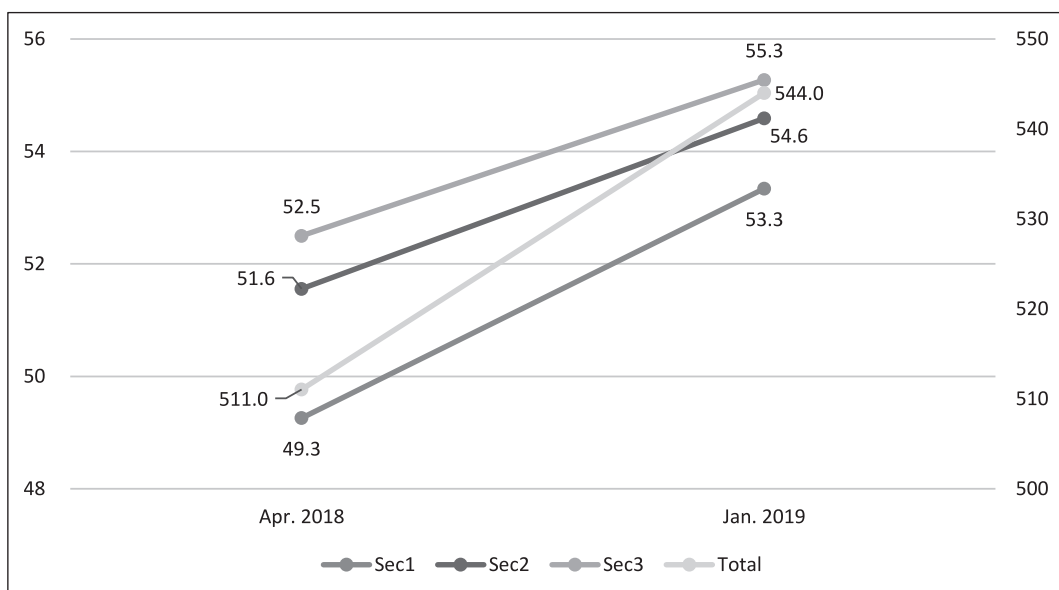


Figure 2. TOEFL ITP® score gains for the second cohort of IUHW medical students



More importantly, this has meant that IUHW first-year medical students can expect, on average, to be able to advance one Common European Framework of Reference (CEFR) level from B1 to B2 (see **Table 1** for the cutoff scores mapping TOEFL ITP® test scores onto CEFR levels).

The main findings of our previous study,<sup>1</sup> which focused exclusively on learners of lower proficiency, were that:

1. Prep-lessons were effective in ensuring only modest score gains on the TOEFL test and in a different section of the test than the one for which specific test-taking strategies were taught;
2. Higher attendance of preparatory lessons is not necessarily correlated with lower [pre-program] test scores or lower self-perceived proficiency;
3. The online preparatory course (MyELT) was not effective in bringing about a significant score gain, but appears to be a useful tool for predicting student performance on the actual tests, especially for its reading section.

Recognizing the limitation of targeting lower proficiency students exclusively, we attempt in this study to answer the same research question in an educational context in which all learners are given the opportunity to attend prep-lessons. This research question is as follows:

**RQ1:** Can test-preparation through the teaching of test-taking skills in a formal class improve TOEFL scores?

An additional limitation of our previous study was that we only collected final score data for the MyELT course. The data only revealed that “lower proficiency students failed to practice sufficiently to achieve a close-to-perfect score in an environment which provides such an opportunity” (p. 63).<sup>1</sup> This left unanswered the questions of whether more time spent using this resource or a more proactive approach to using this resource in a timely manner (as opposed to rushing to complete it right before the deadline) constitute significant factors correlating with higher score gains on the TOEFL test. We have, therefore, refined our previous research question to take into account the above-mentioned factors by collecting data regarding usage of the MyELT course at four points in time in order to answer the following second research question:

**RQ2.** Do students who spend more time and are more deliberate in using an online test-preparation course achieve higher score gains?

In the literature review for the previous article we published on the topic of test preparation, we emphasized that there is no established consensus on the efficacy of coaching students for English as a Foreign Language (EFL) tests.<sup>1</sup> Even in contexts in which TOEFL test scores are used as milestones for graduation, it is often impossible to identify significant correlations between score gains and teaching specific

**Table 1. CEFR levels and TOEFL ITP® cut scores<sup>2</sup>**

CEFR Levels	Total Cut Score	Listening Comprehension	Structure and Written Expression	Reading Comprehension
C1	627	64	64	63
B2	543	54	53	56
B1	460	47	43	48
A2	337	38	32	31

strategies. For example, at Akita International University both the treatment group (who were taught the listening strategy of ‘connected speech’ in a 20-hour course in addition to the regular coursework) and the control group (who did not receive the intervention) saw similar and significant score gains.<sup>3</sup> This is why we thought it would be informative to explore the same questions from a learner’s perspective by taking into account learner autonomy.

The concept of ‘learner autonomy’ is now firmly entrenched in English as a Second Language (ESL)/English as a Foreign Language (EFL) literature,<sup>4</sup> even though Japanese learners of English are often portrayed as requiring significant support in developing a positive attitude toward learner autonomy.<sup>5</sup> Most empirical research operationalizes the theoretical construct of ‘learner autonomy’ through questionnaires that attempt to assess the students’ self-efficacy in learning English, willingness to engage with authentic materials, perceived responsibility towards own learning etc. Such studies have identified a positive correlation between English language proficiency and learner autonomy.<sup>6,7</sup>

For the purposes of this paper, ‘learner autonomy’ should be understood more narrowly to signify ‘reactive autonomy’, which is defined as the “kind of autonomy which does not create its own directions but, once a direction has been initiated, enables learners to organise their resources autonomously in order to reach their goal” (p. 75).<sup>8</sup> This approach needs to be taken because we are interested in clarifying the role autonomy plays for learners who have to work within a given framework (i.e., completing an online assignment at their preferred pace and attending those EC lessons which suit their needs best). Our approach has the advantage of allowing us to measure (reactive) autonomy more objectively by looking at attendance records as well as online study times and answer the following question: When students have a choice over which lessons they attend and how much use they make of online learning resources, how many hours do they devote to learning English (in or out of class)?

Empirical data regarding the usage of online learning resources should be of particular interest to language educators everywhere, because recent advances in leveraging technology to improve learning have given rise to an over-optimistic approach with regard to easily accessible learning

tools. As emphasized in previous research,<sup>9</sup> even adult learners (i.e., those thought to possess a higher degree of autonomy) tend to give up on utilizing such tools as soon as technological hurdles arise, and this paper can shed some light on the resource-usage patterns of younger Japanese learners of English. More importantly, we aim to add to the body of research that paints a more nuanced portrait of Japanese learners of English who tend to be regarded in the literature as a monolithic bloc of students lacking autonomy.<sup>10</sup>

## 2. Methods

As with the first cohort of IUHW first-year medical students (2017-2018), no test-taking strategies were taught during the mandatory courses (English I and II). Whereas for the first cohort, only students with lower English language proficiency were provided with lessons designed to prepare them for taking the TOEFL test, most students in the second cohort (2018-2019) were given the opportunity to attend all, some, or none of the prep-lessons. At this point we should clarify that each year the IUHW School of Medicine accepts 140 students, with roughly 20 slots reserved for international students. The second cohort (n=136) consisted of:

1. Japanese students (n=114) or international students with

native-level command of Japanese (n=5) who can attend EC lessons (n=119);

2. international students receiving scholarships who are required to attend Japanese language lessons within the same timeframe and thus cannot attend EC lessons (n=17).

Test-taking strategies were introduced during the elective classes of the EC course; these lessons fell under the umbrella of the ‘English for Academic Purposes’ topic. In practice, this meant that we were able to measure the efficacy of ‘teaching to the test’ for those students who opted autonomously to attend such prep-lessons, regardless of their English proficiency levels. A total of 11 lessons were delivered on a weekly basis between June and September 2018. As in the previous year, the lesson content was designed around skills for listening comprehension in Longman’s Preparation Course for the TOEFL® Test.<sup>11</sup> A total of 40 students (out of the above-mentioned 119) attended at least one prep-lesson (see **Figure 3** for details). As with the first cohort of IUHW students, attendance saw a precipitous drop after the summer break as students had to cope with an increased study workload for basic medical subjects (**Figure 4**).

A Pearson correlation analysis was carried out involving 27 factors which are defined in **Table 2** below. MyELT course data was collected at four points in time: September 4, 2018

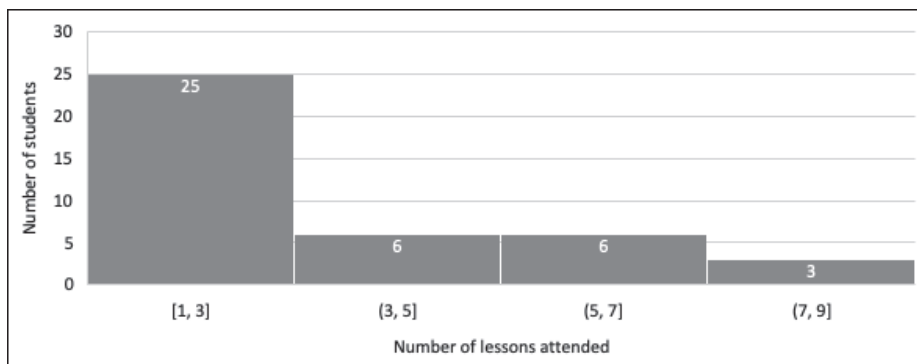


Figure 3. Number of lessons attended for students attending at least one prep-lesson

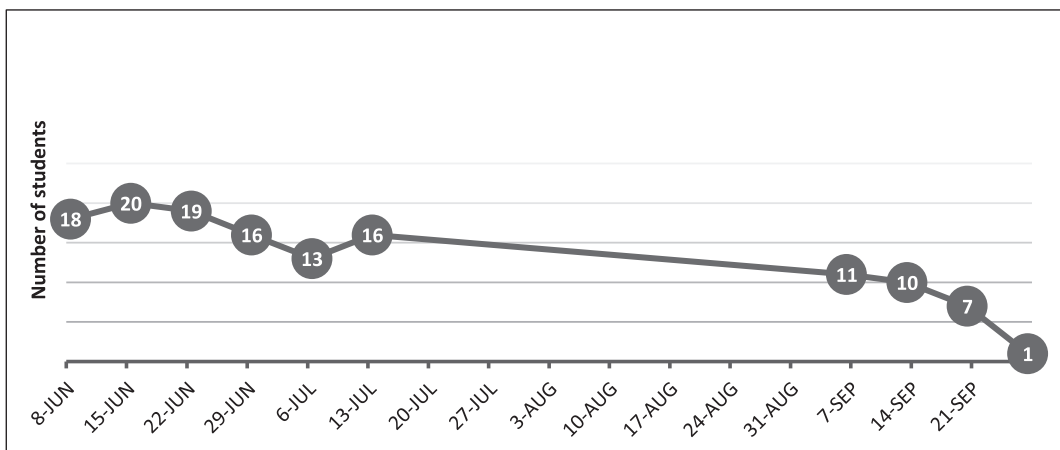


Figure 4. Student attendance of prep-lessons: Chronological trends: June to September 2018

(right after the summer break), September 29, 2018 (one month into a new trimester), December 1, 2018, and January 18, 2019 (the deadline for MyELT completion). Additionally, regression analyses were carried out in cases where significant correlations had been identified between attendance of prep-lessons or EC lessons in general and score gains on the TOEFL test.

### 3. Results

We identified three significant correlations; statistically significant correlations using the two-tailed *p*-value (*p* < 0.05) are shown in **bold** in **Tables 3, 4, and 5**.

First, weak but significant correlations were identified between attendance of prep-lessons and pre-program TOEFL scores (i.e., students scoring less on the initial test are more likely to be attending prep-lessons) (**Table 3**).

Second, weak but significant positive correlations were

identified between attendance of prep-lessons and gains in total and section 1 scores on the TOEFL ITP® test (**Table 4**).

Third, a weak but significant positive correlation was identified between attendance of all EC lessons (including the 11 prep-lessons) and gains in section 1 scores, but not for total scores (**Table 5**).

Given the previous finding that higher attendance of prep-lessons was significantly correlated with gains in section 1 scores, it is important to determine whether there is a correlation between attendance of EC lessons and score gains even for the sub-group of students who never attended prep-lessons (n=79). In other words, we need to ascertain if attending more lessons in an elective English course is correlated with score gains, even in those cases where students entirely skip the course component teaching test-taking skills. No significant correlations were identified between attendance of EC lessons and score gains on any section of the TOEFL test (**Table 6**).

**Table 2. Definitions/Abbreviations for the 27 factors used in the Pearson correlation analysis**

Category	Measured Item (abbreviation)	Measured Item (description)
TOEFL ITP® Test Scores	TOEFL Apr2018	Total score on the official TOEFL ITP® test administered in April 2018
	TOEFL S1 Apr2018	Listening (section 1) score on the official TOEFL ITP® test administered in April 2018
	TOEFL S2 Apr2018	Structure and written expression (section 2) score on the official TOEFL ITP® test administered in April 2018
	TOEFL S3 Apr2018	Reading (section 3) score on the official TOEFL ITP® test administered in April 2018
	TOEFL Jan2019	Total score on the official TOEFL ITP® test administered in January 2019
	TOEFL S1 Jan2019	Listening (section 1) score on the official TOEFL ITP® test administered in January 2019
	TOEFL S2 Jan2019	Structure and written expression (section 2) score on the official TOEFL ITP® test administered in January 2019
	TOEFL S3 Jan2019	Reading (section 3) score on the official TOEFL ITP® test administered in January 2019
	TOEFL Imprv	Points gain between total scores in April 2018 and January 2019
	TOEFL S1 Imprv	Points gain between listening (section 1) scores in April 2018 and January 2019
	TOEFL S2 Imprv	Points gain between structure and written expression (section 2) scores in April 2018 and January 2019
	TOEFL S3 Imprv	Points gain between reading (section 3) scores in April 2018 and January 2019
	Attendance	EC Test-prep Attnd
EC All Attnd		Attendance of all EC lessons (including prep-lessons) (n=119)
EC All Attnd w/o prep		Attendance of all EC lessons for those students who never attended prep-lessons (n=79)
MyELT course data (x 4)	MyELT NumQs	The percentage of completed assignments (i.e., questions) from the online TOEFL preparation course (MyELT)
	MyELT Score	Student's score on the online TOEFL preparation course (MyELT)
	MyELT Time	The amount of time a student spent using the online TOEFL preparation course (MyELT)

**Table 3. Correlations between attendance of TOEFL prep-lessons and pre-program TOEFL ITP® scores**

		TOEFL Total Apr2018	TOEFL S1 Apr2018	TOEFL S2 Apr2018	TOEFL S3 Apr2018
EC test-prep Attnd	Pearson correlation	<b>-0.258</b>	<b>-0.288</b>	<b>-0.178</b>	<b>-0.215</b>
	Significance ( <i>p</i> )	0.002	0.001	0.036	0.011

**Table 4. Correlations between attendance of TOEFL prep-lessons and improvement in TOEFL ITP® scores**

		TOEFL Total Imprv	TOEFL S1 Imprv	TOEFL S2 Imprv	TOEFL S3 Imprv
EC test-prep Attnd	Pearson correlation	<b>0.174</b>	<b>0.247</b>	0.016	0.129
	Significance ( <i>p</i> )	0.043	0.004	0.854	0.135

**Table 5. Correlations between attendance of all EC lessons and improvement in TOEFL ITP® scores**

		TOEFL Total Imprv	TOEFL S1 Imprv	TOEFL S2 Imprv	TOEFL S3 Imprv
EC all Attnd	Pearson correlation	0.150	<b>0.213</b>	0.053	0.068
	Significance ( <i>p</i> )	0.102	0.020	0.569	0.463

**Table 6. Correlations between attendance of EC lessons for students who never attended prep-lessons and improvement in TOEFL ITP® scores**

		TOEFL Total Imprv	TOEFL S1 Imprv	TOEFL S2 Imprv	TOEFL S3 Imprv
EC all Attnd w/o prep	Pearson correlation	0.039	0.039	0.053	0.015
	Significance ( <i>p</i> )	0.733	0.735	0.643	0.896

Additionally, simple linear regression analyses were carried out to illustrate the significant relationships between score gains on section 1 (listening) of the TOEFL test and (a) attendance of prep-lessons (**Figure 5**) and (b) attendance of EC lessons for all students (n=119) (**Figure 6**).

Simple linear regression showed a significant relationship between attendance of prep-lessons and score gains ( $p = 0.006$ ). The slope coefficient for prep-lesson attendance was 0.427, indicating a student's listening score increases by 0.427 points for each extra lesson. The  $R^2$  value was 0.062 so 6.2 percent of the variation in listening scores can be explained by the model containing only prep-lesson attendance.

Regarding the online TOEFL preparation course (MyELT),

weak but significant positive correlations were identified between MyELT progress (i.e., number of questions answered), as well as MyELT score and scores on different sections of the pre-program TOEFL test at three points in time: September 4, September 29, and December 1. In other words, the more proficient students proved to be more diligent in completing the assigned online course and obtaining higher scores at an early stage. In terms of time spent using this online study tool, the correlations were significant only for section 3 (reading). Due to space limitations, only the data for the first point in time (September 4, 2018) is presented in **Table 7** below because the figures and significance values remain stable until December 1.

By January 18, 2019, the official deadline for students to

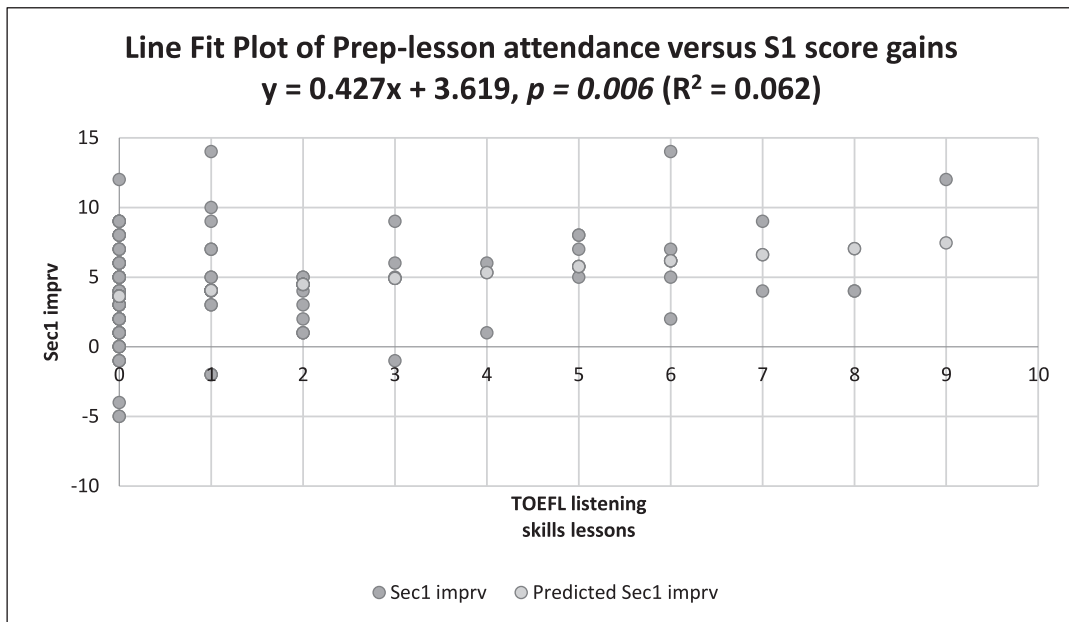


Figure 5. Attendance of prep-lessons versus TOEFL S1 score gains

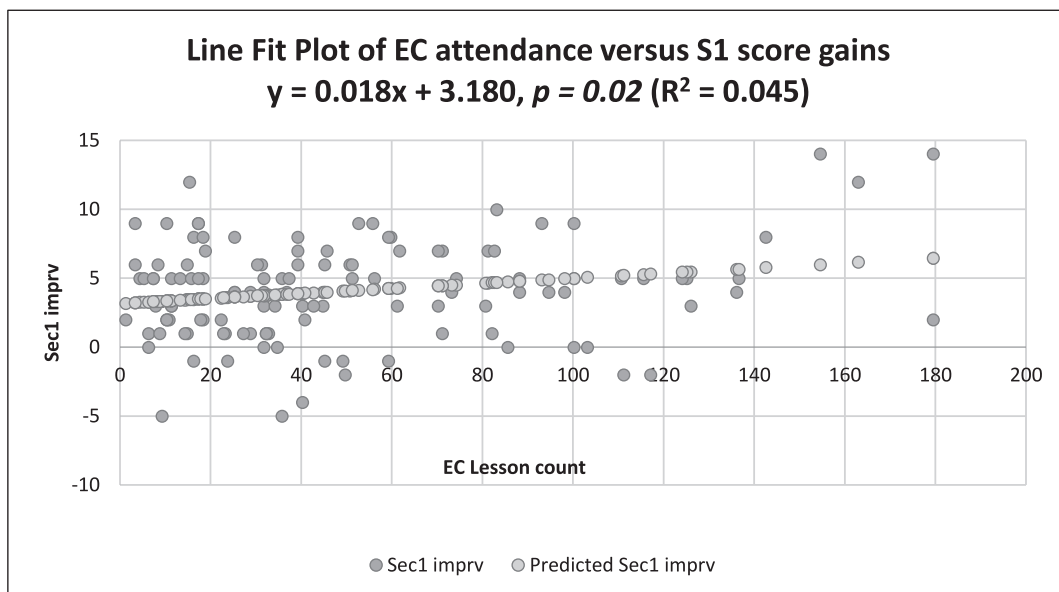


Figure 6. Attendance of EC lessons versus TOEFL S1 score gains

complete this assignment, we can only observe very weak significant positive correlations between MyELT scores and pre-program scores (Table 8).

Lastly, no significant correlations could be identified between MyELT progress (i.e., number of questions answered), MyELT score or time spent using this online study tool and test score gains on any section, at any point in time (Table 9).

## 4. Discussion

In this study, we found that, in a context in which students are provided with the autonomy to choose between lessons delivered simultaneously on a variety of topics, those learners who perform worse on the pre-program TOEFL test are slightly more likely to attend lessons explicitly aimed at preparing them for test-taking (Table 3). With regard to our first research question (Can test-preparation through the teaching of test-taking skills in a formal class improve TOEFL scores?), we have found that attending prep-lessons (covering listening skills) more frequently is weakly but significantly correlated with gains in listening score and total score gains (Table 4). Our data also indicated that attending more lessons in the elective English course (EC) overall (which include the prep-lessons) is also weakly but significantly correlated with listening score gains (Table 5), so it is reasonable to assume that it is not just the prep-lessons which contributed to the score improvement for these students. On the other hand, we have also determined that attending more EC lessons is not significantly correlated with score gains for those students who chose to never attend prep-lessons (Table 6).

This is also visually illustrated in Figure 7, in which stu-

dents are color-coded into two sub-groups according to their prep-lesson attendance record (yellow: never attended prep-lessons; green: attended at least one prep-lesson). Among the four students whose scores dropped despite being in the 'green' sub-group, three attended only one lesson, while the remaining student (three prep-lessons attended) seems to have skipped most EC lessons (attending only 24 out of 180) and thus could only make use of a very limited contact time in English. Contact time is confirmed by the data to be an important factor, as indicated by the fact that two students, both in the "green" sub-group (one prep-lesson attended versus nine) who achieved score gains above ten points in the listening section, participated in more than 150 EC lessons. On the other hand, some variation in performance has to be ascribed to other, as-yet-unknown, factors; for instance, the two students who boasted perfect EC attendance (180 lessons) and who attended the same number (six) of prep-lessons, saw widely varying score gains: 2 points versus 14 points.

Additionally, the data collected in this study allowed us to ascertain that students who perform better on the pre-program TOEFL test tend to be slightly more proactive in completing the online test-prep course at an earlier stage and, unsurprisingly, tend to achieve higher scores in the MyELT course (Tables 7, 8). With regard to our second research question (Do students who spend more time and are more deliberate in using an online test-preparation course achieve higher score gains?), the most surprising finding of this study was that the amount of time a student spends using the online test-prep course is *not* significantly correlated with score gains at any of the four points in time when data was collected (Table 9).

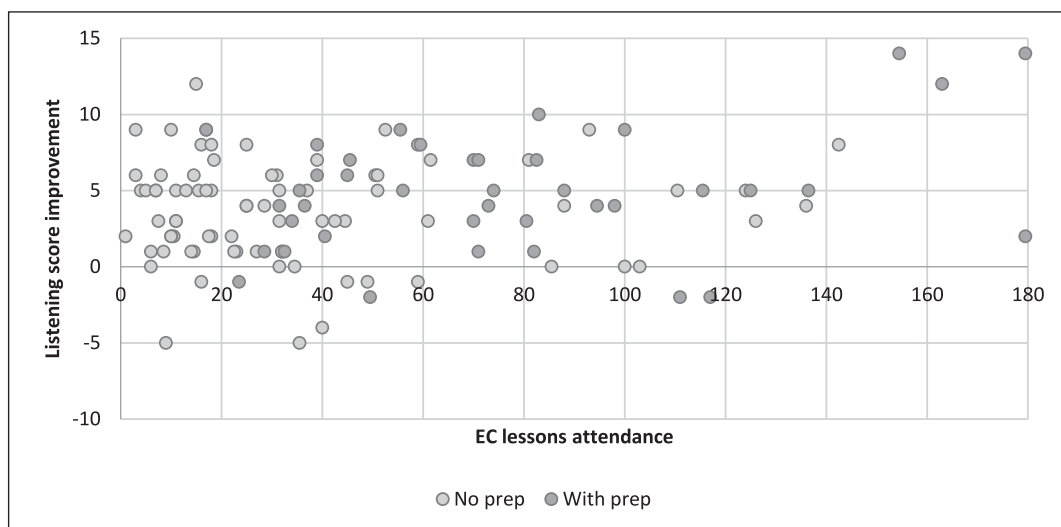


Figure 7. Attendance of EC lessons versus TOEFL S1 score gains by sub-group: 'No prep-lessons attended' and 'At least 1 prep-lesson attended'

## 5. Conclusions and Limitations

The findings of this study suggest that an online preparation course which offers ample opportunities to practice test-taking strategies and to become familiar with the test format does not play a significant role in bringing about score gains even when learners spend more time using such resources. The consistent negative findings (both in this study and in the previous one) regarding the usefulness of having an online test-preparation component suggest that other educational resources (such as mobile apps<sup>12</sup>) should perhaps be explored as alternative tools to enhance learning. It is also important to note that the IUHW English language program lacks a self-access learning center to promote learner autonomy<sup>13</sup> and to provide a physical space where teachers and students can work out the various technological issues encountered when using the online course or other language learning resources.

We demonstrated in this paper that, when first-year Japanese medical students are free to choose whether to attend lessons in an elective course, including a test-preparation

component in an English-language program may help slightly those students who participate in such classes to achieve higher score gains on the TOEFL ITP® test when compared with their peers who opt to skip prep-lessons. While attendance of prep-lessons does not guarantee better performance for all participants and the score gains may vary significantly, the available data support having a course that caters to the needs of those learners who feel they have to prepare for taking a standardized language test. The real challenge for English-program directors is to motivate a majority of learners to attend as many lessons as possible; our experiment with 'reactive learner autonomy' has indicated that only a third of all students will take advantage of such an opportunity.

In the academic year 2019-2020, the elective component (EC) of the IUHW English-language program has been updated based on the findings presented in this paper and more prep-lessons (targeting both first- and second-year medical students and covering both Listening and Reading skills) have been delivered to a larger number of students through a series of policies that will be described in a follow-up study.

**Table 7. Correlations between MyELT progress, score, time spent studying and pre-program TOEFL ITP® scores as of September 4, 2018**

		TOEFL TOTAL Apr2018	TOEFL S1 Apr2018	TOEFL S2 Apr2018	TOEFL S3 Apr2018
MyELT NumQs Sep04	Pearson correlation	<b>0.197</b>	<b>0.203</b>	0.091	<b>0.227</b>
	Significance ( $p$ )	0.020	0.016	0.285	0.007
MyELT Score Sep04	Pearson correlation	<b>0.316</b>	<b>0.312</b>	<b>0.197</b>	<b>0.327</b>
	Significance ( $p$ )	0.000	0.000	0.020	0.000
MyELT TimeSpt Sep04	Pearson correlation	0.145	0.140	0.059	<b>0.186</b>
	Significance ( $p$ )	0.087	0.098	0.488	0.028

**Table 8. Correlations between MyELT progress, score, time spent studying, and pre-program TOEFL ITP® scores as of January 18, 2019**

		TOEFL Total Apr2018	TOEFL S1 Apr2018	TOEFL S2 Apr2018	TOEFL S3 Apr2018
MyELT NumQs Jan18	Pearson correlation	-0.087	-0.045	-0.127	-0.059
	Significance	0.308	0.594	0.135	0.488
MyELT Score Jan18	Pearson correlation	<b>0.188</b>	<b>0.186</b>	0.138	<b>0.174</b>
	Significance ( $p$ )	0.026	0.028	0.104	0.040
MyELT TimeSpt Jan18	Pearson correlation	-0.114	-0.163	-0.094	-0.040
	Significance ( $p$ )	0.181	0.055	0.268	0.639

**Table 9. Correlations between MyELT progress, score, time spent studying, and improvement in TOEFL ITP® scores at four points in time**

		TOEFL Total Imprv	TOEFL S1 Imprv	TOEFL S2 Imprv	TOEFL S3 Imprv
MyELT NumQs Sep04	Pearson correlation	0.044	0.106	0.032	-0.034
	Significance ( $p$ )	0.612	0.221	0.713	0.692
MyELT Score Sep04	Pearson correlation	-0.035	0.061	-0.025	-0.100
	Significance ( $p$ )	0.685	0.479	0.769	0.245
MyELT TimeSpt Sep04	Pearson correlation	-0.076	0.017	-0.078	-0.092
	Significance ( $p$ )	0.381	0.841	0.364	0.285
MyELT NumQs Sep29	Pearson correlation	0.051	0.105	0.043	-0.030
	Significance ( $p$ )	0.557	0.225	0.622	0.725
MyELT Score Sep29	Pearson correlation	-0.032	0.059	-0.019	-0.098
	Significance ( $p$ )	0.715	0.494	0.831	0.255
MyELT TimeSpt Sep29	Pearson correlation	-0.069	0.017	-0.072	-0.086
	Significance ( $p$ )	0.423	0.847	0.408	0.321
MyELT NumQs Dec1	Pearson correlation	0.066	0.110	0.050	-0.011
	Significance ( $p$ )	0.445	0.204	0.560	0.899
MyELT Score Dec1	Pearson correlation	-0.019	0.055	-0.013	-0.075
	Significance ( $p$ )	0.822	0.524	0.880	0.384
MyELT TimeSpt Dec1	Pearson correlation	-0.057	0.021	-0.065	-0.070
	Significance ( $p$ )	0.511	0.806	0.450	0.419
MyELT NumQs Jan18	Pearson correlation	0.058	0.020	0.051	0.051
	Significance ( $p$ )	0.502	0.813	0.559	0.558
MyELT Score Jan18	Pearson correlation	-0.008	0.038	-0.057	0.007
	Significance ( $p$ )	0.922	0.659	0.511	0.939
MyELT TimeSpt Jan18	Pearson correlation	-0.051	-0.002	-0.099	-0.003
	Significance ( $p$ )	0.555	0.986	0.250	0.977

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# Assessment of Evidence-Based Medicine education in the Japanese New Model Core Curriculum using a student-to-student multi-institutional survey

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**Background/Objectives.** Although the Model Core Curriculum of Medical Education in Japan has included EBM (Evidence-Based Medicine) education as of 2016, no multi-institutional surveys have, to the best of our knowledge, been taken thereafter to investigate either the content of EBM education in schools or to gather medical students' opinions. To address this oversight, we conducted a student-to-student multi-university survey to learn about the current status of EBM education at medical schools in Japan and the impressions of their respective students regarding EBM, including their self-assessment of EBM reading skills.

**Methods.** We designed a questionnaire which could be accessed and answered on an online cloud service to conduct the survey. Through an extra-curricular network, the questionnaires were sent to 1st- to 6th-year medical students in Japan.

**Results.** Responses from 296 medical students from 19 universities were collected, of which 286 were deemed valid. Out of the 286 students, 127 students from 16 universities said they had learned EBM in subjects such as English, social medicine, and statistics. They said they found EBM classes interesting, important, and satisfying but they also said they still lacked confidence in reading clinical research papers. However, students who had been taught EBM-specific classes and students who had practiced reading more journal articles were more likely to self-evaluate their EBM reading ability as having improved.

**Conclusion.** The results indicate that almost half of universities in Japan have started EBM education but that a more effective means of teaching needs to be developed so that students will increase their confidence.

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**Keywords** Evidence-Based Medicine (EBM), undergraduate medical education, Model Core Curriculum, English for Medical Purposes (EMP), Keller's ARCS model

## 1. Introduction

In 1991, in the very early days of Internet use, Gordon Guyatt predicted that in the future, physicians would search

for clinical research papers on MEDLINE, and access papers to obtain evidence for accurate treatment.<sup>1</sup> In 1992 he called this method of conducting medical treatments Evidence-Based Medicine (EBM).<sup>2</sup>

The concept of EBM is based on making clinical decisions that reflect research evidence, clinical expertise and patient preferences.<sup>3</sup> It is comprised of the following five steps:

- 1) Asking the right question;
- 2) Searching for evidence;
- 3) Appraising the evidence;
- 4) Acting on the evidence;
- 5) Feedback for steps 1) through 4).<sup>3</sup>

EBM skills are now considered essential for physicians in order to adjust to the rapid introduction of new technologies

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and to offer high quality medical care.<sup>2</sup> Even short courses of EBM teaching can be effective for the acquisition of knowledge and skills.<sup>4-6</sup> Although the introduction of EBM education was anticipated at medical universities worldwide, it was not until 2016 that the Model Core Curriculum of Medical Education in Japan included EBM.<sup>7</sup>

In one survey conducted regarding the previous Model Core Curriculum, questionnaires had been sent to teaching staff at medical universities around Japan asking how their EBM teaching programs had been designed.<sup>8</sup> Moreover, other studies on EBM education suggest that questionnaires given by teachers to their students to investigate student impressions of EBM education may have included student-to-teacher bias.<sup>9</sup> However, to the best of our knowledge, no multi-institutional surveys have asked students for their frank opinions on the content of their EBM education. The aim of this study is to investigate the current status of EBM education in the New Model Core Curriculum in Japan, and to find out students' impressions regarding EBM education by applying Keller's ARCS model of motivation. We also analyzed the relationship between students' learning exposure and their self-assessment of EBM reading skills.

## 2. Methods

We designed a questionnaire which could be answered by using Google Forms, a free web-based data-collecting software. The survey was conducted between 21-28 March 2018. The target subjects were 1st- to 6th-year medical students who agreed to participate in this study by answering the questionnaire. All the questions were asked in Japanese and the respondents were anonymous.

We sent the questionnaire to students in Japanese medical universities through a student network of extra-curricular activities such as baseball teams, kendo teams, and the International Federation of Medical Students' Associations (IFMSA). To quickly collect data for a pilot study, we chose one student we knew from each university and asked them to circulate the questionnaire to their friends at their university.

The questions were partially based on previous surveys on EBM education in Japan but largely modified or newly invented through discussions held by five students of Aichi Medical University, including the first and second authors of this study.<sup>8, 10</sup> Out of over 100 possible questions that were designed to ask students for their frank opinions on medical education, 16 questions were selected that participants could answer in less than 10 minutes. (**Table 1**)

The survey consisted of consent and profile questions (Q1-

Q4) followed by questions focusing on three areas:

- 1) the current status of EBM education (Q5-Q7, Q13-Q17) (e.g. curriculum, teaching materials, teaching methods);<sup>10</sup>
- 2) students' impressions of EBM education (Q8-Q12) (e.g. necessity, usefulness, satisfaction);<sup>11</sup>
- 3) students' self-assessment of basic EBM skills in reading English-language journal articles (Q18-Q20) (e.g. the ability to identify research questions).<sup>12</sup>

The flowchart of our questionnaire included three branches so that participants could skip unrelated questions (**Figure 1**). The questionnaire started by asking for student consent to participate in the research plus a profile question to determine eligibility as a participant. The second- and third-branch questions asked students whether they had taken EBM classes, and whether they had been taught how to read clinical research papers in those classes. In the final question, we asked the survey respondents to comment frankly on EBM education. To analyze the responses, we used EZR statistical software.<sup>13</sup>

## 3. Results

### 3.1 Profile questions (Q3-Q4)

Over the seven days of data collection, we received responses from 296 medical students from 19 Japanese medical universities. 286 of these students were deemed eligible and agreed to participate in this study (286/296; valid response rate 96.6%). The universities with 25 or more participants were Aichi Medical University, Showa University, Sapporo University, Fujita Health University, and Kyoto University (**Table 2a**), with the participating medical students ranging from 1st to 6th year (**Table 2b**).

### 3.2 Current status of EBM education at each university

Out of the 127 students who had received EBM instruction, 85 students answered that they had learned how to read clinical research papers during class: 54 students in English classes, 27 students in Social Medicine, and 20 students in EBM Lectures (multiple answers were allowed). Regarding the questions on teaching materials used in EBM classes, 48 of the 85 students answered that they had read full-length clinical research papers written in English, and 20 students answered that they had read full-length clinical research papers written in Japanese. Other commonly used teaching materials were summarized clinical research papers written in English, such as UpToDate or ACP journal Club (multiple answers were allowed).

**Table 1. Questions in the questionnaire (originally written in Japanese)**

Q1 to Q4 Consent and Profile questions (not included in the table)		Questions on current status of EBM education (Part2)	
<b>Questions on current status of EBM education (Part 1)</b>		<b>Questions on current status of EBM education (Part2)</b>	
<b>Q5</b>	<b>Have you taken classes on EBM?</b> n = 286	<b>Q13</b>	<b>Have you been taught how to read clinical research papers in the EBM class(es)?</b> n = 127
—	Yes 127	—	Yes 85
—	No 159	—	No 42
<b>Q6</b>	<b>What teaching materials were used in your EBM class(es)? Choose one or more from the list below.</b> n = 127	<b>Q14</b>	<b>In which subject(s) did you learn how to read clinical research papers? Choose one or more from the list below.</b> n = 85
—	Original full-length paper written in English 59	—	Social medicine 27
—	Original full-length paper written in Japanese 25	—	Clinical lecture 10
—	Summarized paper written in English (UpToDate, EBM journal, etc.) 50	—	EBM 20
—	Summarized paper written in English (ACP Journal Club, etc.) 24	—	English 54
—	Don't remember 37	—	Statistics 6
—	Others 4	—	Bedside learning 18
<b>Q7</b>	<b>What percentage of your EBM class(es) did you attend?</b> n = 127	—	Don't know 4
—	Almost all 102	—	Others 4
—	About 80% 12	<b>Q15</b>	<b>In total, how many class hours did you spend practicing reading clinical research papers in class?</b> n = 85
—	About 60 to 70% 4	—	None 3
—	Only a few times 9	—	1 to 4 class hours 30
<b>Questions on students' impressions of EBM education</b>		—	5 to 8 class hours 28
<b>Q8</b>	<b>Do you think EBM classes are necessary?</b> n = 127	—	9 to 20 class hours 21
—	Strongly agree 24	—	21 or more class hours 3
—	Agree a little 74	<b>Q16</b>	<b>In which year(s) did you learn how to read clinical research papers? Choose one or more from the list below.</b> n = 85
—	Neither agree nor disagree 20	—	First year 10
—	Disagree a little 5	—	Second year 38
—	Strongly disagree 4	—	Third year 57
<b>Q9</b>	<b>Did you find the EBM classes interesting?</b> n = 127	—	Fourth year 31
—	Strongly agree 14	—	Fifth year 15
—	Agree a little 65	—	Sixth year 3
—	Neither agree nor disagree 22	<b>Q17</b>	<b>In total, how many clinical research papers did you read for practice in class? (≥4 page long, in English)</b> n = 85
—	Disagree a little 18	—	None 5
—	Strongly disagree 8	—	1 to 2 papers 25
<b>Q10</b>	<b>Did you find the EBM classes useful?</b> n = 127	—	3 to 5 papers 33
—	Strongly agree 24	—	6 to 9 papers 15
—	Agree a little 65	—	10 or more papers 7
—	Neither agree nor disagree 23	<b>Questions on students' self-assessment of EBM skills in reading English journal articles</b>	
—	Disagree a little 9	<b>Q18</b>	<b>Can you find the research question in a clinical research paper?</b> n = 286
—	Strongly disagree 6	—	Yes 94
<b>Q11</b>	<b>Do you feel more confident in reading clinical research papers after taking EBM classes?</b> n = 127	—	No 99
—	Strongly agree 4	—	Don't understand what is being asked 93
—	Agree a little 30	<b>Q19</b>	<b>Can you extract PICO/PECO from a clinical research paper?</b> n = 286
—	Neither agree nor disagree 34	—	Yes 54
—	Disagree a little 38	—	No 84
—	Strongly disagree 21	—	Don't understand what is being asked 148
<b>Q12</b>	<b>Were you satisfied with the EBM classes?</b> n = 127	<b>Q20</b>	<b>What factor(s) gives you difficulty in reading clinical research papers? Choose one or more from the list below.</b> n = 286
—	Strongly agree 13	—	English 96
—	Agree a little 65	—	Statistics 74
—	Neither agree nor disagree 31	—	Critical appraisal 86
—	Disagree a little 11	—	Medical knowledge 118
—	Strongly disagree 7	—	Having no experience in reading clinical research papers 94

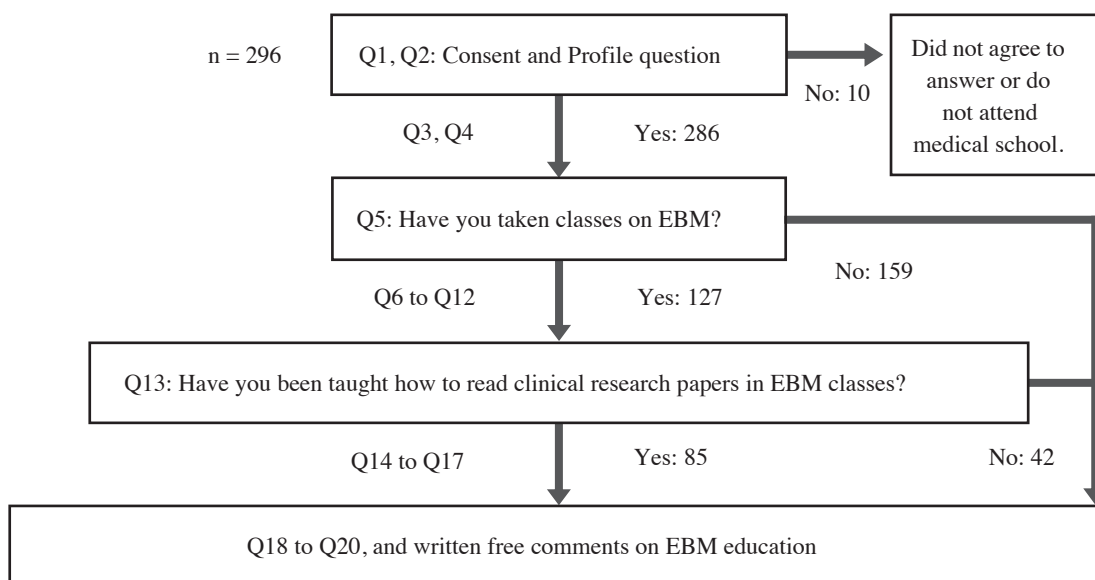


Figure 1. Structure of the questionnaire

Table 2a. Participants by school (n = 286)

Aichi Medical University	47
Showa University	42
Sapporo University	35
Fujita Health University	25
Kyoto University	25
Gifu University	21
University of the Ryukyus	19
Nagoya City University	15
Nagoya University	13
Kanazawa Medical University	12
Mie University	10
Dokkyo Medical University	5
Toyama University	5
Osaka University	4
Tokushima University	4
Hyogo College of Medicine	1
National Defense Medical College	1
Tohoku University	1
Tokyo University	1

Table 2b. Profiles of participants (n = 286)

First-year students	48
Second-year students	74
Third-year students	80
Fourth-year students	31
Fifth-year students	33
Sixth-year students	20

Table 3. Challenging factors in reading clinical research papers

Factors	Number of answers
Medical knowledge	118 (41.3%)
English	96 (33.6%)
Critical appraisal	86 (30.1%)
Statistics	74 (25.9%)
Multiple answers allowed	n = 286 students

### 3.3 Students' impressions of EBM education

To investigate the student impressions of the EBM education that they were receiving, we analyzed their motivation toward EBM classes through the application of Keller's ARCS model.<sup>14</sup> In the ARCS model, learner motivation is composed of four factors, with each corresponding to the respective questions. These were prepared to evaluate the level of each targeted factor:

- Attention (Did you find the EBM classes interesting?)
- Relevance (Did you find the EBM classes useful?)
- Confidence (Do you feel more confident about reading clinical research papers after taking EBM classes?)
- Satisfaction (Were you satisfied with the EBM classes?)

Of the responses from 127 students who had taken classes on EBM, we obtained 79 positive responses ("Strongly agree"

or "Agree a little") for Attention (62.2%), 89 positive responses for Relevance (70.1%), and 78 positive responses for Satisfaction (61.4%). However, there were only 34 positive responses for Confidence (26.8%). This data suggests that although the students found the EBM classes interesting, useful, and satisfying, they did not feel confident about their reading ability.

### 3.4. Students' self-assessment of EBM skills in reading clinical research papers

#### 3.4.1. Challenging factors in reading clinical research papers

In terms of reading clinical research papers, 118 of 286 students expressed that they experienced the most difficulty with medical knowledge (41.3%), 96 students with English (33.6%), 86 students with critical appraisal (30.1%), and 74

students with statistics (25.9%) (multiple answers were allowed) (Table 3).

### 3.4.2. Definition of EBM reading skills, and students' self-assessment

We defined 'EBM reading skills' as skills in extracting information from clinical research papers written in English, in order to conduct EBM. Two questions were included in the questionnaire to measure student self-assessment of EBM reading skills: "Can you find the research question in a clinical research paper?" and "Can you extract PICO/PECO from a clinical research paper?"

Out of the 286 respondents, 94 students felt that they were able to find the research question (32.9%), and 54 students felt they were able to extract PICO/PECO (18.9%). (PICO/PECO are the four components of a clinical research paper: Patient, Intervention/Exposure, Comparison, and Outcome.)

To study the effects of EBM education and the amount of reading practice necessary for students to gain confidence in EBM skills when reading English journal articles, we conducted two sets of cross analyses.

### 3.4.3. Cross analysis 1: students' self-assessed EBM reading skills on finding research questions vs. experience of taking EBM classes

In the first cross analysis, we compared the responses to the following two questions, 'Have you taken classes on EBM?' and 'Can you find the research question in a clinical research paper?' (Table 4). We divided the 286 students into two groups according to EBM learning experiences. Out of the 159 students who had not taken EBM classes, only 24

students (15.1%) said that they were able to identify the research question. In contrast, out of the 127 students who had taken EBM classes, 70 students (55.1%) said they were able to find the research question (Table 4). This cross tabulation shows that the p-value was less than 0.001, which means that students in EBM class group were significantly more likely to positively assess their ability to find research questions.

### 3.4.4. Cross analysis 2: students' self-assessed EBM reading skills on PICO/PECO vs. number of clinical research papers that students read

In the second cross analysis, we compared responses to the following two questions, 'Can you extract PICO/PECO from clinical research papers?' and 'In total, how many clinical research papers that were four-page or longer written in English did you read for practice in class?' We divided the 85 students who had learned how to read clinical research papers in class into two groups: readers of five journal articles or less, and readers of six journal articles or more. Out of the 63 students in the first group who had read 0-5 clinical research papers for practice in class, only 21 students (33.3%) said that they were able to extract PICO/PECO. On the other hand, in the case of students who had read 6 or more clinical research papers for practice in class, 16 students (72.7%) out of 22 said that they were able to extract PICO/PECO. The chi-square test shows that the p-value was 0.0023, which means students with practice in reading 6 or more papers were significantly more likely to affirm their ability to extract PICO/PECO (Table 5).

**Table 4. Cross analysis 1: self-assessed EBM reading skills on research question vs. experience of taking EBM classes (n = 286)**

	Students who did not take EBM classes	Students who took EBM classes
Students who said they couldn't find the research question*	135	57
Students who said they could find the research question	24	70
	159	127

p-value < 0.001 (Fisher's Exact test)

\*Negative responders: students who answered "No," or "Don't understand what is being asked," for the question "Can you find the research question in a clinical research paper?"

**Table 5. Cross analysis 2: self-assessed EBM reading skills on PICO/PECO vs. number of clinical research papers that students read (n = 85)**

	Number of papers students read	
	0 to 5	6 or more
Students who said they couldn't extract PICO/PECO*	42	6
Students who said they could extract PICO/PECO	21	16
	63	22

p-value = 0.0023 (Fisher's Exact test)

\*Negative responders: students who answered "No," or "Don't understand what is being asked," for the question "Can you extract PICO/PECO from a clinical research paper?"

## 4. Discussion

In the question asking students if they had received EBM education in their curriculum, only 127(44.4%) out of 286 medical students said that they had taken EBM-specific classes. This percentage seems reasonable, as 64 participants in the study were fourth- to sixth-year students whose curricula had been established before EBM education became a requirement. Another possible reason is that 48 participants were first-year students who had yet to start their EBM education, which was offered only from the second or third year, even in the new curriculum. Furthermore, this figure may also reflect the number of participants whose EBM education had been insufficient, or was not impressive enough to remember.

According to the results of our questionnaire, the most popular teaching materials used in EBM classes were clinical research papers written in English and in fact, many students answered that they had learned EBM in their English classes. As students feel difficulty not only when reading English texts but also in understanding medical or statistical information, English teachers could collaborate with medical doctors and statisticians in teaching EBM. One practical collaborative teaching method is that after the students read a journal article, have them study in small groups to make a list of questions regarding the content, and then invite a medical doctor specialized in the area to give a short lecture, as well as answering their questions.

Regarding the questions asking students to evaluate EBM education, we applied the ARCS model of motivation. There were differences in the ratio of favorable responses with more than 60% of the students answering 'Yes' to the questions regarding Attention, Relevance, and Satisfaction, but with only 26.8% answering 'Yes' in their self-evaluation of Confidence. This ratio difference may suggest that although the EBM teaching programs were motivating, the students were not certain about their having acquired EBM reading skills. One possible reason for the responses concerning the confidence level was that students were more critical in their assessment of themselves than in their assessment of a course.

For students to be able to feel confident in reading clinical research papers, a more effective means of teaching needs to be developed. From a learner's perspective, we would therefore recommend that students start reading a short or summarized article to initially understand the basic structure of the article. After that, they should read a longer but simple study-designed article, such as RCT (randomized controlled trial) research. To understand more about statistics, students

could also read articles including meta-analysis, the Kaplan-Meier survival curve, or sensitivity/specificity. Teachers could also give highly motivated students a chance to design their own study, let them create their own presentation slides and script, and publish a paper. In this way, they can both improve their EBM reading skills and boost their confidence. In fact, this is what the authors have experienced through writing this paper.

Related to the issue of reader confidence, we also investigated where students felt difficulty in reading clinical research papers. Students identified difficulties as being due to insufficient medical knowledge (41.3%), a lack of English reading skills as a second language learner (33.6%), immature levels of critical appraisal (30.1%), and a lack of familiarity with statistics (25.9%). All these fields should be considered as required training for a medical student to acquire EBM reading skills, so teachers in clinical medicine, English education, social medicine, and statistics need to cooperate to construct an interdisciplinary course. In fact, in a similar nationwide questionnaire that was distributed to instructors at medical schools, more than half of the respondents said that staff teaching basic and clinical medicine and all other courses in medical schools should be involved in EBM education.<sup>8</sup>

Regarding the two questions created to investigate student self-assessment of EBM reading skills, asking about student capability in identifying a research question, and the ability to extract PICO/PECO, the percentage of those who thought they could extract PICO/PECO from a clinical research paper was lower than that of those who thought they could find the research question in a clinical research paper. This difference suggests that extracting PICO/PECO is a more complicated task than just finding the research question.

The question on self-assessment of research-question-identification capability was cross-analyzed with the question on student experience of EBM class instruction. Compared to students not having taken EBM-specific classes, more students with EBM-specific classes answered that they could find the research question in a clinical research paper, and that they felt that they had acquired basic EBM reading skills. Looking at the students' self-assessment, EBM classes seem to be effective in developing those basic EBM reading skills which could not be easily acquired through self-study.

The cross-tab analysis between PICO/PECO-extraction capability and the number of clinical research papers students had read showed that well-trained students were more likely to think that they could extract PICO/PECO from a clinical research paper. Our finding suggests the minimum number of papers students need to read to gain confidence in

acquiring EBM reading skills seems to be six but further study will be necessary to verify a more exact number. In future surveys, we should be careful to ask not only the number of papers read but also the content of learning: how they learned EBM in class or how deeply they were engaged in reading each clinical research paper.

## 5. Limitations

Our study contains the following three limitations:

- a. The data collected from students included self-assessment of basic EBM skills in reading English journal articles, but their actual reading skills were not assessed.
- b. The number of universities that received the questionnaire was limited. A more wide-reaching survey needs to be conducted.
- c. The numbers of respondents varied from university to university. Ideally, the difference in the number of respondents should be smaller.

## 6. Conclusion

Our multi-institutional survey asked medical students in Japan to describe the status of EBM education in their schools and found that almost half of the universities surveyed in Japan had introduced EBM education in subjects such as English, social medicine, and statistics. Students had found their EBM classes interesting, important, and satisfying but they did not highly self-evaluate their own level of confidence in reading clinical research papers. Even then, our data indicated that students who had been taught in EBM-specific classes and students who had practiced reading more journal articles were more likely to evaluate their EBM reading ability as having improved.

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# Student voices in scientific English education: A report on the Tsukuba Scientific English Conference 2019

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In this report, we will introduce the Tsukuba Scientific English Conference (TSEC) 2019. The aim of this two-day conference was to provide researchers, students, and faculty with an opportunity to improve their scientific English skills, such as academic writing and presentation, through a series of lectures by experts and educators in the field. This conference has grown out of an educational session, the Scientific English Workshop, held at the University of Tsukuba's annual Tsukuba Global Science Week conference. In this report, we will introduce the background of this new conference and give a brief outline of the proceedings across the two days. TSEC was a strongly student-focused event, with students involved as staff, participants, and presenters. Therefore, included in this report are short summaries and reflections by the graduate students who gave presentations on the first day.

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**Keywords** Scientific English, academic writing, conference presentations

## 1. Introduction

The first Tsukuba Scientific English Conference (TSEC) was held on October 3rd and 4th, 2019. It was organized by Professors Mayers and Koganezawa of the University of Tsukuba's Faculty of Medicine, with assistance from the International Office of the School of Medicine and Medical Science, as a satellite conference of the larger Tsukuba Conference that was held concurrently. This conference was primarily designed as an educational event to promote scientific/academic English skills. There is increasing pressure on researchers, faculty, and students to publish their research in international journals and present their findings using the English language at international conferences; hence, there is a strong demand for opportunities to learn how to improve

these skills. TSEC was also created as an opportunity for graduate students to share their experiences of carrying out and communicating their research internationally. The strongly student-centered nature of this conference is one of its key features. In this report, therefore, following an outline of the background and basic proceedings of TSEC 2019, the students who were invited to give talks on the first day will reflect on their respective presentations.

## 2. Scientific English Workshop (2016-2018)

TSEC has evolved from the Scientific English Workshop, a half-day educational session of the University of Tsukuba's annual Tsukuba Global Science Week (TGSW) conference (<https://tgs.w.tsukuba.ac.jp>), held over the last 10 years at Tsukuba International Congress Center. The main purpose of the Scientific English Workshop was to help the participants improve their scientific English skills through a range of practical talks from educators, professionals, and also students. The workshop consisted of three 40-minute educational lectures by faculty members and one or two shorter lectures by students (a list of topics and speakers for the Scientific English Workshop is presented in **Table 1**). This highly

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successful session had, over the three years it was held, become a very popular event, attracting relatively large audiences and always being well received by the participants and presenters alike. Over the three years, it had expanded to include not only members of the faculty of the University of Tsukuba, but also guest speakers from other universities.

An integral part of the program was the inclusion of student presentations, which reflected the ethos of the TGSW conference—originally organized to bring students and faculty from Tsukuba and partner universities together to present their research and network towards creating research collaborations. The student presentations have not only been beneficial for the students themselves to gain experience presenting in English, but also for the students and faculty who were members of the audience to learn from their experiences. In 2018, when the TGSW conference was focused on supporting the United Nations' Sustainable Development Goals (SDGs), one of the students addressed SDG number 5, "Gender Equality," in her talk describing the representation of women in the sciences. This talk left a strong impression on the organizers, and we realized the potential for this session as a platform for addressing important issues facing our students in their lives and future careers.

### 3. Tsukuba Scientific English Conference (TSEC) 2019

In 2019, the University of Tsukuba expanded the scope of TGSW by partnering with local government and industry to organize the first Tsukuba Conference (<https://tsukuba-conference.com>). Because the first two days of Tsukuba Conference were for "invitees only," it seemed an opportune moment to launch the Scientific English Workshop as a rebranded, semi-independent, mini-conference. The proposal was accepted and generously funded by the Faculty of Medi-

cine, University of Tsukuba. The conference was advertised through a purpose-built website (<https://mayersthomas.wixsite.com/website>), the Tsukuba Conference website, a Facebook events page, and the university and Japan Association of Medical English Education mailing lists.

Professor Surr from Leeds Beckett University, UK, delivered the keynote presentation. Her lecture, which focused on the role of clinicians and patients in designing and carrying out research, was an eye-opening introduction to recent trends in research methodology in the UK. Professor Miyamasu, Professor Langham, and Dr Weisburd's lectures focused on scientific writing and presentation in English. Dr Weisburd was the first speaker from a company to present at the conference. His company, ELSS Inc (<http://www.ellss.co.jp/en/>), based in Tsukuba, specializes in the editing and translation of scientific documents, and it was an invaluable opportunity to learn from his 25 years of experience working in that industry. A number of the talks, including those given by Professor Yanagisawa and Dr Changarathil, touched on issues of diversity, gender equality, and lesbian, gay, bisexual, and transgender (LGBT+) representation in the sciences. The conference also became a platform for the students to share their concerns about issues facing both international students in Japan and Japanese students studying overseas. Findings of a questionnaire survey carried out after the conference showed that many of the attendees felt encouraged and challenged by the honesty of the student talks.

On the first day of the conference we had 93 participants (including 10 presenters), who were mainly students and faculty of the University of Tsukuba (80%), but as the event was open to the public, some scientists from other research institutes in Tsukuba also attended (20%). The main reasons expressed by the participants were: a desire to improve scientific English skills in general (53%); a requirement to write papers/dissertations in English (20%); to network and make

**Table 1. A list of speakers and titles for the Scientific English Workshop session**

Year	Speaker	Affiliation	Title
2016	Flaminia Miyamasu	University of Tsukuba	Writing in style: an introduction to the American Medical Association Manual of Style and other style guides
	Bryan Mathis	University of Tsukuba	Scientific language for data presentation
	Thomas Mayers	University of Tsukuba	Tools for effective visual communication in science
	Veronica Medrano Romero	University of Tsukuba	The path to publication: a graduate student's experience
2017	Timothy Minton	Keio University	The little things that ruin your paper
	Grant Black	University of Tsukuba	Science, innovation, and global communication
	Bryan Mathis	University of Tsukuba	Increasing presentation efficiency
	Rudy	University of Tsukuba	A non-native way to comprehending scientific English
2018	Michael Guest	University of Miyazaki	No speech, no lecture, no TED: performing effective academic English conference presentations
	Bruno Jactat	University of Tsukuba	Frequency discrimination and learning: some ideas for improving your listening skills
	Flaminia Miyamasu	University of Tsukuba	Hands-on editing of a scientific abstract
	Haruna Ueda	University of Tsukuba	Presentation in English: advantages and disadvantages for non-native speakers
	Hanna Tagomori	University of Tsukuba	Representing women in science: perspectives from a Master's student



new friends (20%); to study/live/travel abroad in the future (7%). As well as attending the conference, some students worked as volunteers and provided invaluable help setting up the conference venue, running the reception desk, and taking photos. As well as coffee, snacks, and other refreshments, a free luncheon was provided for participants, which created a good opportunity for further discussion and networking.

The second day of TSEC was held as part of the student Presentation Session at Tsukuba Conference. The Student Presentation Session has been a feature of TGSW for over 10 years. This year, 80 student presenters from Medical and Life Sciences created posters to introduce their research and, preceding the afternoon poster presentation time, gave two-minute oral introductions on their research (a list of presenters and titles from this session can be accessed here: <https://tsukuba-conference.com/wordpress/wp-content/uploads/2019/05/Program-and-guideline-for-presentation.pdf>). At the conclusion of the Student Presentation Session, 10 students won awards for their presentations, being evaluated on their abstract, two-minute oral introduction, and poster. Following the afternoon poster session, two lectures were given on the subject of using English for oral and poster presentations by Professor Mathis and Professor Millar of the University of Tsukuba (see **Table 2** for the lecture titles). Following these lectures, Professor Surr, after talking to students about their posters, gave direct feedback and comments about the students' discussion of their research. Approximately 90 participants attended the TSEC English lectures on the second day.

Feedback from attendees of TSEC collated from the questionnaire indicates very high levels of satisfaction with all aspects of the conference, including the faculty and student

presentations, venues, duration, and organization. In their comments, a majority of respondents indicated how helpful the educational lectures by faculty were and how they wish more time could have been given to scientific writing. Scientific writing is of great importance for students and researchers; therefore, providing opportunities for scientists to improve their academic writing skills, not only during their years in university education, but also throughout their careers, is essential.

#### 4. Student presenters' reflections

The following are brief reports written by the TSEC 2019 student presenters, in which they summarize and reflect upon their presentations and their participation in the conference.

**Presenter: Vishal Gor, graduate student, University of Tsukuba**

**Title: Expanding horizons my experience as a graduate student in Japan**

Towards the middle of 2019, I was kindly invited to give a short oral presentation at TSEC to be held later in October of the same year. The theme of the talk was left open for me to decide on, and I chose the topic of my experience as a foreign graduate student in Japan. My talk consisted of a brief introduction about myself and my research interests, but the focus was on the challenges I experienced in my move to Japan and the impact, both positive and negative, that they had on me. I decided on this particular topic as I felt that talking to the audience about my personal experience in Japan would be the most effective way to convey my strong positive opinion on the concept of stepping out of "comfort zones" and taking

**Table 2. List of speakers and presentation titles for Tsukuba Scientific English Conference 2019.**

Date	Presenter	Affiliation	Title
October 3rd	Claire Surr	Leeds Beckett University	Health research: the important role of clinicians and patients
	Vishal Gor	University of Tsukuba	Expanding horizons: my experiences as a graduate student in Japan
	Yuka Endo	University of Tsukuba	Be positive, be confident, and do not hesitate: some tips for non-native English speakers
	Chrispin Mahala Manda	University of Tsukuba	Research experiences, opportunities, and scientific communication in Japan: a perspective of an African student.
	Christina Andrea Sylvia	University of Tsukuba	University student's mental health and international students' acculturation
	Clive Langham	Nihon University School of Dentistry	Presentation skills: How to handle the question and answer session
	Richard Weisburd	ELSS Inc.	Effective assertions in research writing
	Yuta Taniguchi	University of Tsukuba Hospital	3 Tips to Make Your English Communication More Productive and Pleasant
	Flaminia Miyamasu	University of Tsukuba	Common Mistakes in Scientific English
	Gopakumar Changarathil	University of Tsukuba	Striving for diversity and excellence in science: Experiences of a graduate student
	Hiromi Yanagisawa	University of Tsukuba	Lessons from the reverse culture shock: My 24 years of experience in the US research institution
October 4th	Neil Millar	University of Tsukuba	Five steps to prepare an amazing presentation
	Bryan Mathis	University of Tsukuba	English Tips for Poster Presentations
	Claire Surr	Leeds Beckett University	Comments and feedback

on new challenges as a way to develop character and appreciate different views and cultures.

Giving my talk was quite a challenge in itself. I had not presented in front of a large audience before, and I had never talked on topics that were not work related. This was, in part, why I jumped at the opportunity as it allowed me to diversify my oral presentation experience. I thoroughly enjoyed the session and felt that I had effectively communicated with my audience by having an engaging presentation that was not too long and thus captured and held the attention of the listeners. Upon reflection, I believe the message that I wanted to convey was too broad and a more defined topic may have driven home a stronger point. Nevertheless, the experience was useful at gaining insight into non-scientific presentation structure and delivery methods. I was extremely grateful for the opportunity to practice my presentation skills in a relatively “safe” environment, where I could confidently learn from any mistakes I made without severe repercussions, and I can only hope that the conference continues to provide this opportunity for students in the future.

**Presenter: Yuka Endo, graduate student, University of Tsukuba**

**Title: Be positive, be confident, and do not hesitate: Some tips for non-native English speakers**

I presented some tips for non-native English speakers when they speak English. Based on my experiences, I came up with three tips. First of all, it is better to speak English than not to do so. Some people miss the chance to speak English because they try not to make mistakes. However, the important thing is learning that not *perfect* but *understandable* English is necessary to communicate with others. Therefore, it is good not to hesitate to speak out in English. Secondly, self-confidence is important. Some people appear to have no confidence because of their modest and reserved personality. In this case, they underestimate their own ability and then stop trying to speak English. To be confident, it is important to believe in your own abilities and to keep trying. Finally, being positive is also an essential skill. Everyone gets into difficulties with communication even if they are native speakers. Some people are disappointed and give up. Although it is necessary to reflect on things, it is more important to be positive, change your way of thinking, and persevere.

I chose this topic because I would like to share my experiences that I thought would be useful for others, especially for Japanese students. I got the chance to think about why speaking English is so difficult for non-native speakers objectively. I studied abroad for a year in the UK as a research student. At

that time, I noticed that my speaking skills were remarkably low compared to other skills. It was hard to understand why that was so, because I had been studying English for more than 10 years at school in Japan. However, by comparing myself to other international students and listening to their advice, I realized that my attitude toward speaking English was the obstacle. As I shared in my presentation, my speaking ability improved considerably after getting some useful advice from my lab mates about how improve my English communications skills; they encouraged me to speak as much as possible and not hesitate to express my thoughts and opinions.

My goal for this presentation was to present the contents accurately, and I think I achieved the goal. I was extremely nervous and felt my hands tremble because it was almost my first time to make a presentation in English. However, I received some questions and comments during discussion time and felt the audience understood my presentation. Nevertheless, I feel I need to improve my presentation skills. I could not make enough time to prepare my presentation and practice reading my script before I spoke. Maybe it was boring for some people, because I made little eye contact and just read. If I have another chance, I will try to do a better presentation, but I learned that trying something new is interesting. At first, I was hesitant to speak at TSEC because I anticipated many difficulties with speaking in English in public, and sharing my personal experience. However, many people supported me and I decided to give a presentation. I learned and felt many things at TSEC, especially finding my strong and weak points. I think TSEC is an amazing opportunity for students. During our graduate studies we have little opportunity to hear other students’ opinions about scientific English (not science). Also, the professors’ talks were very useful, especially those related to writing papers, because we do not have many chances to learn how to write scientific papers.

**Presenter: Chrispin Mahala Manda, graduate student, University of Tsukuba**

**Title: Research experiences, opportunities, and scientific communication in Japan: a perspective of an African student**

One’s environment, including culture, resources, and people, influence the type of education and research experience students acquire in an academic setting. Individuals’ background and personality are also suggested to be among the factors associated with acculturation and subsequent study experience. As an international student from Malawi, Africa, I had some expectations before coming to study in Japan, a

country with a different culture. Having studied in Japan for nearly five years studying on Masters' and doctoral programs, I have accumulated unique experiences pertaining to research, scientific communication, and opportunities for study. I, therefore, seized the opportunity to give a talk on such issues when I was invited to speak at TSEC.

I started my talk with an introduction of Malawi to give the audience a picture of my background, and expectations of coming to study in Japan. I explained what and why I chose the research I am currently conducting. I achieved my objective of introducing the current and projected burden of diseases in Malawi and sub-Saharan countries focusing on non-communicable diseases (NCDs), which are increasing rapidly. Japan has accumulated unique experience on handling the epidemiological transition, from which African students, who represent populations that have lower rates of life expectancy, can learn from. While there are challenges on communicating research findings due to the language barriers, there seems to be progress on addressing these challenges.

I felt that my presentation dwelt on important issues evidenced by the many audience members who came up to me to ask questions and discuss my presentation during the lunch break. I was also happy to be approached by a member of the audience, an expert speaker, who advised me that I could improve my presentation by increasing the font size in my figures' texts since he was not able to read them easily. This was one of the unexpected benefits of this conference. I have been to scientific conferences where individuals with poor presentation slides were never given feedback, thereby left to repeat the same mistakes again and again. I now make sure that I ask a good number of my colleagues to review my presentation slides for both content and style. I will also try to ensure that I have enough practice with the audience in mind to make sure that they can follow my presentations. I hope TSEC will continue to invite both students and expert speakers to help students improve their presentation skills.

**Presenter: Yuta Taniguchi MD, Junior Resident, University of Tsukuba Hospital; research student, University of Tsukuba**

**Title: Three tips to make your English communication more productive and pleasant**

An academic conference is a great chance for networking, as well as academic discussion. However, few people are aware of the importance of preparing for the networking opportunities. For better networking, it is helpful to prepare your own unique answers for the following three questions: Why are you attending the conference? What are your aspirations? and How can you help your research partners in

future collaborations? In my opinion, this practical technique is especially helpful for those who are not fluent in English, to make their English communication more productive and fruitful.

Audience reaction was positive, and I also was able to organize my thoughts by making a presentation at TSEC. What could be improved was to make my message even clearer and easier to understand. Tsukuba is a city where researchers and students gather from all over the world, but there is not enough chance to meet each other and share our knowledge. I believe TSEC is a great opportunity for these passionate young scientists to learn scientific English skills and to connect with other young scientists who have various backgrounds.

**Presenter: Andrea Christina Sylvia, graduate student, University of Tsukuba**

**Presentation Title: University students' mental health and international students' acculturation**

On October 3rd, I was kindly invited to give a short oral presentation at the first TSEC. Although the focus of the conference was on scientific and academic English writing and presentations, it importantly incorporated a variety of topics regarding understanding cultural context and studying/working abroad, while also providing the participants with a glimpse of how they can expand their academic prospects by improving their communication skills, being open to different views, and taking on new challenges. On this premise, I took the opportunity to highlight the compelling matter of mental health on campus with specific focus on international students. Taking up new challenges and acculturating abroad can be very stressful indeed for international students, although discussion and awareness of mental health and wellbeing issues in universities is essential for all students and faculty.

From a personal point of view as a PhD student in Occupational Psychiatry, being able to give this short speech on the subject I am studying was an experience of great worth and personal fulfilment, as promoting awareness on mental health is one of the main reasons I chose to pursue my doctoral studies in the field. TSEC provided me with a chance to talk to an audience of different academic backgrounds about a matter that may, though, affect all, raising awareness, initiating thought and discussion, while hopefully reassuring the participants that, no matter the challenge, support is available and there is no stigma in reaching out for it. Additionally, speaking in this conference was particularly educational for me, as I had to formulate my presentation in a way that would be stimulating and easily followed by an audience

mostly unfamiliar with psychology or psychiatry-related information and terminology, a valuable experience different than most scientific presentations I had to perform during my studies.

On the whole, this conference provided a platform where participants, and especially students, could not only hone their English writing and presenting skills, but also get a more complete insight of the importance, the challenges, and the opportunities presented by international collaboration, the first step of which is being able to express yourself and your research in English. I think that it is crucial for universities to support and promote such initiatives, where open discussion and exchange of knowledge and ideas is encouraged, and thus would wish to see the continuation of efforts such as this conference.

**Presenter: Gopakumar Changarathil, Post-doctoral researcher, University of Tsukuba**

**Title: Striving for diversity and excellence in science**

For TSEC 2019, I was invited to speak on the subject of diversity in the sciences. Framed within my own context as a newly-graduated post-doctoral researcher and member of the LGBT+ community, I introduced a number of studies and their main observations published within the last 8 years that address the issue of diversity and inclusion in science, technology, engineering and mathematics (STEM). The findings of these studies clearly show the strong bias towards men in the STEM subjects, not just in terms of representation, but also the lack of equality of opportunity, payment, trust, and acknowledgment given to women and minorities. I highlighted the severity of this problem in Japan, typified by the scandal involving manipulation of entrance examination results to favor male applicants at Japanese medical schools. I also introduced some studies that give a positive argument for the role of diversity in the sciences, namely, that it is essential for excellence, and offered some observations about how greater diversity might be achieved. I selected the following challenges that those of us involved in the sciences need to consider: unconscious (or conscious!) bias; cultural differences during scientific discussion; accommodation/better planning of research institutes; diversity and the need for inclusion committees in departments; and finally, the need for patience, safe spaces, and conversation.

TSEC was a unique opportunity for me to share my thoughts on this subject to fellow students, researchers, and

university faculty members. I have given presentations about my research before at international conferences, but this was the first time for me to speak formally about this important issue. Giving students and the under-represented the opportunity to formally share their experiences, both positive and negative, in an open, safe space, is an important step forward to addressing the issue of diversity in the sciences.

## 5. Conclusion

Considering the opinions of the student presenters, we are both encouraged and challenged: encouraged to believe that TSEC is a worthwhile and fruitful venture, but also challenged that, as a university, there is still a way to go on the path to diversity and improvement of education for Japanese and non-Japanese students alike. Students are expected to communicate their research through publications and presentations in English in order to graduate; thus, training in scientific/academic English is a crucial ingredient of graduate school education. But beyond education, the process of “internationalization” of Japanese universities is a much greater issue than simply offering tuition in English; it necessitates a greater sensitivity towards cultural diversity, which for an extremely homogenous society like Japan, must be very difficult. Listening to the voices of students, both international and Japanese, as they share their research and also express their concerns about issues like equality, diversity, and mental health, we can learn from their experiences and get a better picture of where we are succeeding and where we need to improve. We hope that we can continue this conference in the future and look forward to your participation. For more information please feel free to contact the authors.

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# Coordinated development of courses, materials, and a word list for undergraduate medical English education

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In this paper, we reflect on a central government-funded project to develop materials, both online and for the traditional classroom, along with a list of medical terms, for students in their early years of undergraduate study. The project developed over a period of 6 years, and has benefited greatly from strong support from senior members of Hiroshima University's medical school. We show how this highly integrated project has resulted in the formation of a syllabus through the interlocking development of courses, materials, and a word list. We go on to describe how, in the later stages of the project, we have successfully trialled some of the material, originally designed for third-year students, with second-year students, and how work has begun on a glossary created to aid students in learning the words on the list in conjunction with the units of material.

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## 1. Introduction

### 1.1. ESP/EMP in a globalising world

In recent years, tertiary institutions in Japan have been increasingly concerned with the need to provide students with a more globally-oriented education, and English for Specific Purposes (ESP) has an important part to play in realising this. Laurence Anthony<sup>1</sup> makes the following observation:

“The growing impact of English in the world of academia cannot be overstated... academic institutions in non-English speaking countries now have a responsibility to not only provide their students with a solid understanding of their chosen discipline, but also the skills needed to take that knowledge, apply it in new and exciting areas of research that involve interdisciplinary, multinational groups of researchers, and eventually publish it in high-ranked journals.”

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The field of medicine in Japan is no exception: in 2015, the Japan Society for Medical English Education (JASMEE) published a set of guidelines developed with the aim of raising the medical English proficiency of Japanese medical students to levels necessary for “meeting the global standards of medical English education”.<sup>2</sup> At the authors' own institution, Hiroshima University, there has been a particular awareness of this need to “globalise” since the university was awarded “Top Global”<sup>3</sup> status in 2014. In Japan, where learners are rarely exposed to English outside the classroom, the challenge faced by both students and teachers in pursuing globalisation is that “learning tends to be instrumental, such as the desire to get higher scores in English proficiency tests, not integration into an English-speaking community.”<sup>4</sup>

### 1.2. The need for tailored syllabuses and materials

Within the context of an increasingly interconnected world, and with English continuing to gain importance as a lingua franca, it is the responsibility of ESP instructors to find ways of addressing the specific academic (and occupational) needs of their students. The pedagogical materials used in the classroom are obviously important, in that they reflect the target communicative situation. One way of addressing students' needs is to systematically develop a programme of in-house materials along with a system of materials-sharing,

allowing materials to be tailored towards a particular context.<sup>5</sup> Within the field of English for Medical Purposes (EMP), efforts have been made, many detailed in this journal, to develop appropriate curricula, materials, and courses for medical students in Japan.<sup>6,7,8</sup>

The teaching of medical English to university undergraduates can be considered a niche target language setting, and for many EMP practitioners creating their own materials is the only option available; suitable textbooks either do not exist or contain critical flaws that prevent them from being adapted. The lack of appropriate, readily available materials was a major issue to be addressed in the project documented in this paper.

### 1.3. The importance of providing learners with the words they need

Vocabulary is, of course, a central component of language learning in any area. Within ESP, while many courses focus on content rather than on language forms, vocabulary can be the major organisational strand in a syllabus. Although there have been suggestions that learning technical words is the natural consequence of studying a particular discipline, and teaching them should be the role of the subject specialist,<sup>5</sup> Chung and Nation<sup>9</sup> and Fraser<sup>10</sup> have shown that technical vocabularies can be very large and should not, therefore, be ignored in the English classroom. To aid students with the learning of specialised words in medical fields, a number of researchers have constructed corpora and word lists.<sup>11,12,13</sup> For the most part, though, such lists have been compiled independently of course creation. There are also many excellent texts and online resources for studying vocabulary, but again, these may not fit the specific needs of a particular group of learners. In the project described here, however, a word list has been created which consists of terms embedded in a set of specially designed materials. This has been achieved through an interplay of discourse analysis, corpus analysis, and the input of key medical professionals.

## 2. Objective

Against the backdrop outlined above, the overarching aim of our project has been to develop a comprehensive medical English syllabus through the integration of courses, materials designed for communicative language teaching, and a word list comprising terms embedded in the materials. By creating a glossary from this word list, we seek to create a reference document that will be valuable for students and teachers alike in facing the challenges of learning a specialised professional discourse.

## 3. Beginnings of the project

The authors of the paper belong to Hiroshima University's Institute for Foreign Language Research and Education (FLaRE), and our involvement with medical English began in response to the medical school's request to provide a course to supplement the current medical English teaching of its undergraduates. The result was the creation, in September 2012, of a four-day intensive medical English course (IMEC) for third-year students.<sup>14</sup>

Four teachers from FLaRE were involved, and were asked to orient the course towards the productive skills of speaking and writing. The teaching team reviewed and adapted existing medical English teaching materials, online articles, and DVDs. Twelve classes were taught to each student, and a small glossary was provided, comprising items extracted from Wikipedia articles on Ebola and tuberculosis (used for summary-writing activities), and additional words considered by the teachers to be important in each unit. In the course feedback, students' comments highlighted an awareness of their lack of specialised vocabulary knowledge, and the word list was rated highly. With the course continuing into a second year, a small research group within the institute was established to develop materials tailored towards our students' specific requirements, along with a pedagogical word list.

## 4. Creating a tailored medical English course

### 4.1. A body-systems based approach to materials development

At the start of the project, planning revolved around the collection and analysis of medical research articles, following Fraser's<sup>10</sup> methodology for creating a corpus and word list for pharmacology. However, the focus quickly shifted to the construction and analysis of a corpus of reference books, beginning with *Gray's Anatomy for Students*.<sup>15</sup> This decision was taken following semi-structured background interviews with senior members of the medical school, all of whom stressed the importance of anatomy as the starting point of medical study, along with the relevance of medical reference books.

To help us with our initial aim of collecting suitable research articles, the medical school provided a set of ten broad medical categories, many of which were associated with body systems. This suggested the possibility of building units of material reflecting categories that could be easily linked to body systems, integrating anatomy with physiology and some basic medical problems. Another reference book,

*Harrison's Principles of Internal Medicine*,<sup>16</sup> was the basis of a second corpus to be used for analysing key medical terms.

Throughout the project, the input of medical specialists has helped us greatly to improve the content and accuracy of our course materials. Working in close cooperation with the medical school, we have produced materials which integrate anatomy and physiology in body systems (e.g., the digestive system) with diseases and conditions related to those systems (e.g., reflux esophagitis, colon cancer, duodenal ulcers, appendicitis). In each unit of materials, key anatomical terms are first introduced and presented in context; these terms are then used to talk about the particular body system under study. Through the reading of an essay, students then study diseases related to the body system. Finally, productive skills are developed through doctor-patient dialogue practice and summary writing. Broadly, we have been working on the basis of a parallel syllabus, with the intention that students will use the schematic knowledge acquired in their medical studies to connect with the English material in the course.

#### 4.2. Use of corpus analysis

As English teachers/applied linguists our knowledge of the medical field is limited, and in the initial creation of medical texts, there will, inevitably, be important terms and text-structuring phrases which have been overlooked or used inappropriately. Corpus analysis of *Gray's Anatomy for Students* and *Harrison's Principles of Internal Medicine* has made it possible to check for such omissions and discrepancies, allowing us to increase the number of key terms contained in each unit of materials.<sup>17,18</sup> Overall frequency in the corpus is the main criterion used in determining the importance of terms, but range (distribution across the different sections of the book) has also been considered, and has helped us to identify categories of regularly occurring terms that can act as links between the different units.

#### 4.3. Creation of additional materials and course integration

As mentioned above, the pedagogic materials were originally designed as a key part of the intensive medical English course for third-year students (IMEC), which was to supplement their regular medical English (ME) classes. Evaluations of student performance in the course were to be given to the medical school's English specialist, who would combine them with his own assessments and assign final grades to the students. Once the contents of the intensive course had been fixed, the English specialist had the opportunity to add two new units of material to his syllabus for third-year students. Over time, the two courses have been merged to create an

integrated syllabus for students comprising 14 units of material (**Table 1**). American English is used for the materials, primarily because of students' greater familiarity with American English spellings for technical terms.

## 5. Incorporating flipped learning

In 2016, the decision was made to adopt a flipped learning approach with the IMEC component of the syllabus. With flipped learning, the classroom becomes a place where learners are expected to use knowledge they have acquired beforehand, often online, primarily in group activities that encourage them to use their productive and creative skills.<sup>19</sup> Inspired by a conference presentation on this mode of learning<sup>20</sup>, we felt it would work well in our context.

### 5.1. Motivation

The primary reasons for making the change were to increase efficiency regarding classroom contact hours, and to enable students to self-study content relating to receptive skills, such as essays and vocabulary. Although the classroom-based course was well regarded by students and the medical faculty, it placed considerable demands on instructors' time and our institution's budget. In previous years, the course had been taught "face-to-face" in the classroom with a team of four instructors over a period of four days. With a flipped learning approach, content relating to receptive skills could be placed online.

### 5.2. Course content

The e-learning content includes essays and audio, along with a variety of pedagogic matching and multiple choice tasks. By integrating this online material into the course, it was possible to reduce the classroom-based component to

**Table 1. Units of teaching material**

Unit	Course	
0	Planes, terms of location, views	IMEC Anatomical position
	<b>Anatomy/Physiology</b>	<b>Field</b>
1	Musculoskeletal system (knee)	IMEC Orthopedics
2	Nervous system (brain)	IMEC Neurosurgery
3	Pulmonary system	IMEC Pulmonology
4	Circulatory system (heart)	IMEC Cardiology
5	Endocrine system	IMEC Endocrinology
6	Digestive system	IMEC Gastroenterology
7	Liver	ME Hepatology
8	Integumentary system	ME Dermatology
9	Lymphatic system	ME Immunology
10	Urinary system	ME Nephrology/Urology
11	Female and male reproductive system	ME Gynecology/Urology
12	Eyes	ME Ophthalmology
13	Ear, nose, and throat	ME Otorhinolaryngology

two days, allowing room for further content to be added and taught in a traditional, non-flipped way. An additional day was allocated for end-of-course testing.

### 5.3. Course evaluation

Our findings regarding evaluation of the flipped learning course have been documented in some detail in previous papers.<sup>21,22</sup> To sum up, we found evidence that the course was successful in achieving both teaching and learning efficiency. The responses to a feedback questionnaire showed that almost all the students found the flipped learning course useful and had high levels of motivation. The results of a vocabulary test administered at the end of the course were not significantly different from the previous year's test, following a regular classroom-taught course, indicating that, for a variety of tasks, studying online was equally as effective as studying in class.

Although the flipped learning format worked well, and the number of classroom teaching hours was substantially reduced, the taught part of the course appears to be what the students rate most highly. From the perspective of time, flipped learning is efficient, as much of the input side of the course can be covered through self-study online and monitored by the instructor. However, it is important to ensure that providing opportunities for students to interact in the classroom with their teachers and peers continues to be a priority.

## 6. Trialling the course with second-year students

### 6.1. Motivation for a second-year course

At the time the course was attempted, first-year and second-year students studied general English, with all the teaching of medical English taking place in the third year. Given the challenges of EMP in terms of the size and complexity of its vocabulary, we felt that students would benefit from the chance to start studying it in the second year, particularly as they become increasingly busy with specialised medical subjects and clinical training as they progress through the grades. Also, beginning in the second year might create the opportunity for more advanced English study in the third year.

### 6.2. Implementing the second-year course

Our major concern was whether second-year students would be able to cope with the content of the materials. A key issue related to parallel syllabuses, which basically meant that students should study areas in English that they had

already covered in their medical classes. In terms of broad areas of learning, medical students tend to be primarily focused on anatomy and physiology in their second year, and then cover diseases in their third-year lectures. As the anatomy/physiology section of the third-year materials covered only a third of each unit, there was some worry as to how well the students would be able to cope with the remaining materials.

The course was held in October 2018, and consisted of six taught classes, online study, and an evaluation class comprising a vocabulary test and writing task. Although it was a voluntary course, students were informed that if they passed, they would be exempted from the third-year intensive course. In total, 37 students (out of a total of 120 in the year) enrolled in the course, and 35 completed it, although several students had to re-take the vocabulary test.

## 7. Course assessment

Both the original classroom-based course and the flipped course have received positive evaluations, with similar levels of satisfaction and test performance recorded over the years. The change to flipped learning represented a big change, and we were particularly interested in determining whether second-year students would be able to cope with a course that was originally designed for third-years. As with the original third-year courses and the flipped learning course, the success of the second-year course was evaluated through analysis of test results, as well as both quantitative and qualitative feedback.

### 7.1. Test results

The most objective measure of assessment was a 50-item vocabulary test, which was essentially the same as that taken by third-year students on the September 2018 intensive medical course. Consequently, data from the same year can be compared (**Table 2**). Although the average score for the second-year students was slightly lower than that for the third-years, a t-test showed no significant difference.

### 7.2. Quantitative feedback

After the test, student feedback (summarised in **Table 3**) was elicited with a 4-point Likert scale. Questions addressed student motivation, the usefulness and clarity of the materi-

**Table 2. Mean vocabulary test scores and standard deviations**

	Second-year course 2018	IMEC 2018
Mean score	75.8	80.1
Standard deviation	16.1	14.7



**Table 3. Quantitative feedback for the second-year course**

Category	Mean
Motivation (4-point scale, highest: 4, lowest: 1)	3.5
Usefulness (4-point scale, highest: 4, lowest: 1)	3.5
Clarity (4-point scale, highest: 4, lowest: 1)	3.5
Improvement (2-point scale, yes: 2, no: 1)	1.9
Word list (4-point scale, highest: 4, lowest: 1)	3.4
Course as a good way to study (2-point scale, yes: 2, no: 1)	1.9

als, perceived improvement, the usefulness of the course word list, and satisfaction with the course as a means of improving English skills (**Appendix 1**). The results showed that motivation was very high, perhaps unsurprising given that the course was a voluntary one. This is also reflected in the very low drop-out rate of only two students in a class of 37.

### 7.3. Qualitative feedback

We also received written comments from 13 students (**Appendix 2**); this disappointingly low number was probably due to the time constraints of completing a vocabulary test, a writing task, and feedback within the space of approximately 90 minutes. However, several students wrote at length and provided interesting observations, which are provided in full in Appendix 2. These comments, focussing on content, vocabulary, and technical weaknesses of the materials, are summarised and discussed below.

#### 7.3.1. Appropriacy of content

Although feedback was generally positive, there were some criticisms. One student commented as to whether, in terms of content, it might not be better to concentrate on anatomy and physiology, as these were the areas that students had already studied. This raises the important issue of parallel syllabuses mentioned earlier. In reality, the third-year course had never been a completely parallel syllabus: the materials included doctor-patient conversations and role-plays, activities more appropriate for students in higher grades. However, it is true that the course diverged further from a parallel syllabus when taught to second-year students. In our view, the loss of a parallel syllabus is compensated for in two ways, relating to vocabulary development and materials design, and reflected in other students' comments.

Another student observed that whereas the grammar in the materials was simple, the vocabulary posed difficulties. From a materials design perspective, this was intentional, as sentences had been written as clearly and simply as possible in order to facilitate a focus on the vocabulary. In addition, essays and dialogues were also designed to be used for productive skills work, meaning that the material was written

with the intention of encouraging the students to use clear, uncomplicated English.

#### 7.3.2. The focus on vocabulary

A further comment we received regarding vocabulary was from a student who observed that a focus on word parts had helped with understanding. This student felt it was sometimes easier to understand the meaning of medical terms in English from a knowledge of the way they could be built up than by being given their Japanese translations. One factor in sensitising students to word parts was that the second-year course had more time allocated to the same medical English content, and with only one instructor teaching the units, there was an opportunity to illustrate how to break down complex terms into their parts. By integrating anatomy and physiology with diseases, it was possible to show the connections between words. For example, the students knew the three *meninges* (*dura mater*, *arachnoid membrane*, and *pia mater*), but without disease terms they might not have connected *meninges* with *meningitis* or *meningioma*, or *dura mater* with *subdural hemorrhage*. In addition, *subdural hematoma* and *subarachnoid hemorrhage* were useful for illustrating word parts: the prefix *sub-*, and *hemo-/hemat/o-*. Although the students had not studied many of the diseases in the materials, the disease essay was relatively simple in content, often defining the disease and listing symptoms; for the majority of students, it was easy to understand most of the terms from the context.

#### 7.3.3. Technical issues with the materials

One of the few students who were unhappy with the course pointed out some of the technical weaknesses of the materials. Students had been given a set of eight pages for each of the six units. These included new self-study sections on treatments, which were not used during the course. However, the student had attempted them in his/her own time, but had no access to the answers. Also, the word list that was issued at the start of the course had not been updated since the previous course, so that not all the key words in new or recently edited sections were on the list.

## 8. Word list and glossary development

### 8.1. Creating a list of words embedded in the materials

With the completion of 14 units of material, it has been possible to develop an initial full draft of the medical English word list. All units of material were analysed, and key terms identified and listed on the pages of a spreadsheet. Each unit

was allocated a letter (e.g., Nervous System = C; Pulmonary System = D), and each term within the unit a number. These sheets were then combined to create a full list.

## 8.2. Constructing a glossary of key terms

Completion of the word list has enabled us to begin work on the construction of a three-part glossary. In approaching this task, we have aimed at simplicity of presentation. While the analysis of medical vocabulary is highly complex,<sup>23</sup> students and teachers need the presentation of items to be as simple and straightforward as possible.

In Part 1 of the glossary, the terms are listed by unit. As well as the key term that appears in the unit, other semantically linked terms and word parts are added. For example, the term *abnormal* appears in the units. In addition, the noun form *abnormality* is added:

<sup>C001</sup> abnormal ( <i>adj</i> ) 異常な abnormality ( <i>n</i> ) 異常	Drowsiness is defined as abnormal sleepiness during the day.
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Similarly, with the term *tumor*, the word parts *onc/o-* and *-oma* are added. The term first appears in the central nervous system unit, but it also occurs in four other units. In these later units, the learner is referred to the full entry in the earlier unit. Part 1 is therefore designed to supplement the student materials, and to offer the students a way of learning terms that appear within a particular medical field (**Table 1**).

<sup>C148</sup> tumor ( <i>n</i> ) 腫瘍 -oma ( <i>wp</i> ) onc/o- ( <i>wp</i> )	Brain tumors are due to abnormal cell division which may be benign or malignant.
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An important issue concerns the handling of multi-word terms. For example, how should *superior vena cava* be presented? It makes no sense to separate *superior* from *vena cava*, and so the term should be listed in its entirety. *Superior* is an important anatomical term in its own right, and as it appears in the first unit of materials it does not require a separate entry in the cardiovascular system unit. However, there may be multi-word terms where it is necessary to also list one of the words separately due to its importance (e.g., *pulmonary*, *pulmonary valve*). Part 1 is in many ways the most important part of the glossary, where students are given a manageable number of words within an existing unit of materials.

In Part 2, the entire list of key terms appearing in the materials is presented. Reference to items in Part 1 allows for easy access to the entries in it.

In Part 3, the focus is on word parts. These can be divided

into affixes (e.g. *sub -*, *- itis*), initial combining forms, (e.g. *onc/o*), and final stem elements (e.g. *- oma*), all of which are listed alphabetically. Examples of the use of the word part in terms from the glossary can be listed and referenced. Consequently, Part 3 can be used to help sensitise the students to such parts.

<i>-oma</i>	swelling tumor	腫 腫瘍	adenoma <sup>C003</sup> , angioma <sup>C007</sup> , astrocytoma <sup>C016</sup> , glioma <sup>C093</sup> granuloma <sup>E079</sup> hematoma <sup>C073</sup> hystero myoma <sup>L059</sup> meningioma <sup>C093</sup> sarcoma <sup>L131</sup>
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For teachers, too, an awareness of the ways in which words can be broken down is important. Most EMP teachers are English specialists rather than medical doctors, often with only a rudimentary knowledge of medicine. Consequently, a teacher's guide needs to offer advice on how to present complex terms. For example, in the guide for the central nervous system unit the following is written:

*Focus on the cerebrum and related words and word parts:*

**cerebrum**

**cerebro/spinal fluid**

**cerebral cortex**

*Also highlight the prefix peri-, meaning "around" or "enclosing":*

**peri/osteum**

*The literal meaning of "periosteum" is "enclosing bone", and it is the layer of connective tissue covering most of the bones in the body. Other examples are:*

**pericranium**

**pericardium**

## 9. Discussion

The content of the course itself is designed to help students take their first steps in medical English by gaining a thorough grasp of the nature, characteristics, and use of key medical terms. Our original aim was to produce a medical English word list embedded in a set of teaching materials, and at the time of writing this article, the list itself contains approximately 2,000 items. However, with the creation of a three-part glossary, we have been able to expand upon the list by introducing valuable semantically related terms and word parts. As Chabner<sup>24</sup> observes, "medical words are like individual jigsaw puzzles. Once you divide the terms into their component parts and learn the meaning of the individual parts, you can use that knowledge to understand many other new terms" (p. 2). If students can get a feel for complex medical terms, and build up their knowledge of word parts,

this should allow them to expand their medical English vocabulary more quickly, and to process and analyse the large amount of vocabulary that they are exposed to in their medical courses. The student materials have been designed to aid the teaching of courses that fall within the communicative approach. However, while the materials are very important for the course itself, once the course has finished, the more useful reference document may be the glossary, where students can rapidly review the key terms that they have encountered.

Regarding the staging of the learning process, the results of the experimental course indicate that at Hiroshima University, a sizeable proportion of second-year students are able to study at least half of the 14 units of material successfully. The key factor in this appears to be the students' knowledge of anatomy and physiology. Knowing each part of the body and how it functions in a healthy state is enough for them to be able to assimilate new information on the ways in which the body may be affected by injury or disease. For example, learning about an aneurysm, symptoms associated with its rupture, and how it can be treated is relatively straightforward; in contrast, the actual activity of treatment itself is highly complex.

In terms of delivery, the use of a flipped learning approach has been successful, and at the time of writing (October 2019) two new optional courses for second-year students have successfully been completed. A possibility for the future is to create flipped learning for the entire 14 units of material; this would potentially create space for innovating with new material.

## 10. Conclusion

This paper has documented a project involving the coordinated development of EMP courses, materials, and a pedagogical word list for undergraduate medical students. Regarding the syllabus which has evolved in the process of the research, the key themes emerging are content, the staging of learning, and course delivery.

The aim of the research team as we move forward is to build on the third-year course, which is designed to give the students a grounding in medical terminology, contextualised through illustrative essays and dialogues that are then used to work on basic productive skills. In the background interviews conducted in 2013, some members of the medical school indicated that undergraduates should be able to write basic case reports in English. Future goals include getting the students to use their medical English to write such reports, and to develop the oral skills necessary to discuss them.

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**Appendix 1. Course feedback questions and answers**

*Please answer all the feedback questions.*

1) How motivated are you to develop your medical English skills?

*Very motivated (4)      Motivated (3)      Not so motivated (2)      Not motivated (1)*

2) How useful was the course?

*Very useful (4)      Useful (3)      Not so useful (2)      Not useful (1)*

3) How clear were the classes and teaching materials?

*Very clear (4)      Quite clear (3)      Not so clear (2)      Not clear (1)*

4) Do you feel your English improved during the course? If so, in what way(s)?

*Yes (2)      No (1)*

5) How useful was the medical word list?

*Very useful (4)      Quite useful (3)      Not so useful (2)      Not useful (1)*

6) Was the course a good way to improve your English skills?

*Yes (2)      No (1)*

7) Please write your comments about the course in English on the answer card.

**Appendix 2. Student comments on the course**

(Students' comments have been written verbatim, with no attempt to correct grammatical mistakes.)

1. I think a lot of sentence in this course is very easy, but the words are difficult. So I must study the words hard, that is very useful for a medical student. Thank you.
2. It is very good because we can actively speak English about medicine. In the future, I'm going to speak English actively.
3. Too difficult for me.
4. This class is a little difficult for me. So I'll study hard when I take this class at third-year student.
5. Good!
6. Very good!
7. This course was pretty good as I expected. However, there's some room for the materials to be improved, though my feedback can be nonsense if you're created the material for future medical course for 1<sup>st</sup> and 2<sup>nd</sup> year students. The material has so much info that we cannot handle them all. Especially when it comes to the class that only held once a week. If you're considering keeping this type of course, I would recommend you create a shortened or summarised version of it. Furthermore, the material focuses on not only physiology and anatomy but also on clinical stuff. Since we haven't learned the names of symptoms of disease nor doctor-patient conversation even in Japanese, I guess it can be better to focus on anatomy and physiology. I know the benefit of focusing on science and clinics simultaneously, but some of us were struggling... I'd appreciate it if this helps you to improve the course.
8. This course was very useful for me. When I studied anatomy first in Japanese it was so complex to me, so I couldn't remember anatomical words in English. But I knew English words sometimes are more easier to understand, because many anatomical words in Japanese are just translated from English. In fact I could learn many useful words (such as -itis, peri- and so on) in English. This made my understanding deeper. It was also good to discuss symptom. That made difficult symptom easier to understand.
9. Thank you for opening the medical English course. Your classes helped us develop our English skills.
10. It was a little quickly, so it was hard for me to study and review the medical English words. However, it was very useful class. I'm lucky to study medical English in the second grade. Thank you so much.
11. Hello, thanks for several weeks Davies! I'll answer the feedback questions, here. First, this course was not so useful, I think. That's because I wanted all answers to both of online materials and especially materials in class. I tried materials in class but it was difficult for me (ex. Last pages) For studying I wanted these answers. Secondly, the medical word list was not so useful. That's because I checked often the list, but some words I found in materials online or in class were not there. So, after all, I used smartphone to examine meanings of words.
12. Thank you.
13. This course was very useful to me.

# Should EMP serve primarily to teach the medical humanities? Some thoughts and opinions

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**Keywords** EMP, medical humanities, interpersonal skills, doctor-patient discourse

## 1. Introduction and background

Foreign languages have long been considered an essential element of the humanities, the implicit notion being that developing foreign language skills may serve as a means of producing more holistic, well-rounded learners. As a result, medical students worldwide are also required to complete courses in 'humanities' subjects in 'pre-med' courses (generally within the first three years of medical school in Japan) with the expectation that medical professionals, as all professionals, serve society better if educated as well-rounded individuals.

Indeed, without this 'education of the heart', Faculties of Medicine would become mere medical vocational schools. There is almost no argument to be made against the notion that medical students should gain exposure to the humanities as an essential part of their tertiary clinical training.

English learning as an agent of the 'medical humanities' ('MH') not only refers to the confluence of social, interpersonal, and cultural communication skills, but also attempts to create a holistic understanding of the patient-healthcare worker relationship in a manner that goes beyond the strata of purely clinical communication. MH attempts to join the produce of the humanities (Fine Arts, Languages, Sociology/Anthropology/Philosophy etc.) with the scientific/clinical perspective of healthcare workers.

A question that is gradually emerging within English for

Medical Professionals (EMP) circles, however, is whether the teaching of EMP should focus more upon teaching medical content (typical clinical discourses, terminology, academic English skills) or serve primarily as an agent to deepen the wider-ranging humanist sensibilities of our students.

The tension between these two perspectives was particularly evident at the recent EALTHY (European Association of Language Teachers for Healthcare) Conference, which was held in Castellon, Spain, in October, 2019. There, proponents of an MH approach to EMP (such as Dr. Jim Parle and Prof. John Skelton from Birmingham University in the U.K., plus Lancaster University's Prof. Elena Semino), were vocal in making the case that English language teaching specialists could, or should, serve as functionaries in conveying a humanistic focus to medical students. However, the majority of conference parallel session presentations tended to revolve around more objective analyses of clinical discourse forms and EMP teaching methodologies.

Based on the positions expressed both at this conference and in related discussions with various EMP professionals, in this opinion piece I'd like to list five features that impress me regarding the MH approach to EMP, as well as five areas that I find problematic.

## 2. Five impressive traits

- 1) Taking a history should be seen primarily as a collaborative process between patient and clinician and not merely as a series of Q&A exchanges, as if it were a television interview. History taking should be a matter of eliciting the patient's story, allowing the patient to generate a narrative, rather than being a doctor-centered line of inquisition.
- 2) The ICE formula (eliciting the patient's *Ideas, Concerns,*

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and Expectations as opposed to merely obtaining data) should serve as the fundamental 'template' for history taking. In such a scenario, more of the clinician's time is spent listening than asking questions.

- 3) At the 2019 EALTHY Conference, Dr. Jim Parle argued that clinicians should not consider patients as mere 'cases' but should recognize that they are actually *experts in the field of themselves*. This again implies a greater focus upon listening to the patient. Active listening has long been the norm in the field of counseling, where counselors are encouraged to allow the client to speak without interruption or letting their professional status dominate the encounter. Prompts to elicit the patient's thoughts and feelings (such as repeating only a single keyword as a signal for the client to expand upon a point) are viewed as preferable to intrusive questioning. Further, in order to gain the patient's trust, particularly when eliciting personal/private/sensitive information, open-ended interpersonal skills, as opposed to closed question formats, should be encouraged. *'Could you tell me more about that'* would thus become one of the most common and helpful healthcare worker utterances. The use of the patient's name as well as displaying interest in what may initially seem like personal or disconnected anecdotes of the patient are also paramount.
- 4) Developing a differential diagnosis has long been presumed to be the focal point of history taking for the clinician. However, above and beyond the traditional focus upon generating a diagnosis, clinicians should be aware that the greatest concern for patients is not merely knowing what the diagnosis is but what this means for their lives, including the nature of the subsequent management and follow-up: How will it affect them fully as a person? How will it impact their daily lives? How can/will it be managed and at what personal cost? As a result, a greater focus upon sensitivity to the impact of the patient's condition and the nature of the treatment/management at a personal level should be emphasized in role-plays and simulations.
- 5) False empathy of the *'Patient: I have a slight fever. Doctor: Oh! I'm so sorry to hear that!'* variety should be discouraged. Patients will be sensitive enough to pick up cues of empathy, or lack thereof, from their caregivers. Exaggerated or scripted expressions of concern are likely to be interpreted as disingenuous behavior. Empathy

signals extend to body language. Adopting a flexible posture, one that is open to the patient but not so direct as to be intimidating, should be encouraged.

### 3. Five questionable traits

- 1) Often, the implicit assumption made by proponents of using English as a vehicle for teaching MH is that those of us with background in the humanities are more sensitive, aware, moral, and humane than those who come from STEM backgrounds. STEM people, the subtext seems to say, need our input to better understand people's feelings and to create more interpersonally effective forms of communication and holistic care. Often, this is stated as if STEM people are either insensitive or oblivious to these factors and thus require 'our' enlightened help. I do not accept this premise in any form and believe it panders to outdated and negative stereotypes, mainly serving for those of us with backgrounds in the humanities to pump our own chests.
- 2) While English teachers at the tertiary level should be expected to understand how effective communication is constructed in English-language settings, including interpersonal and/or cross-cultural skills, very few of us have the counselling or psychological backgrounds needed to feel comfortable about including professional levels of such content in our teaching arsenal. Most of us are not experts in sociology, philosophy, anthropology etc. and we should not presume to enter that territory with any authority. Let's not overstep our bounds under the dubious banner of having expertise in understanding 'greater humanity'.
- 3) Concerns stated by proponents of an MH approach regarding much clinical nomenclature (i.e., that the phrase 'history taking' is a presumptuous term and that 'eliciting the patient's story' is preferable) comes across as window dressing of the virtue-signalling variety. The reality of the speech event or interaction has the same uptake regardless as to how we label it among teachers and/or practitioners.
- 4) Given the time limits and stressful workload that most doctors face, is it reasonable to believe that they should be behaving like counselors, spending a great deal of time trying to suss out each patient's 'narrative'? Doctors are not social workers and most work under considerable time and workload constraints; they do not



need further complications. Informally, I've recently asked several clinicians and medical students how they rank the following qualities among doctors: a) Communication skills, b) Clinical knowledge, c) Hands-on skills, d) Humanitarian principles. Unsurprisingly, 'D' almost always comes in last. Imagine that you are a patient facing a life-endangering operation. Which two of the above would be your priorities? Of course 'D' might be more of a concern if and when one is choosing a GP for long-term purposes, but this does not match most Japanese (or even wider Asian) clinical milieus, where patients tend to see rotating teams of specialists rather than a regular 'home' doctor.

- 5) It is likely that some aspects of MH approaches will not cross cultures particularly well. Even indirect attempts at prying into the 'deeper' personal aspects of a patient's life will likely be viewed as intrusive and inappropriate by many Japanese (and, possibly, other Asian) patients. Many, if not most, such patients may prefer, and expect, the standard Q&A routine. Many patients may feel that the doctor should stay in his/her professional territory and not assume social worker or counselor 'roles'. This sense of keeping one's distance as a mark of professionalism is particularly important in East Asian cultural milieus.

## 4. Summary

Many EMP teachers have already (perhaps unknowingly) adopted an MH dimension to their classrooms in the form of stressing the importance of greeting patients and using interactive discourse signals to guide the exchange, gaining consent regarding personal inquiries, explaining their reasoning for diagnosis/investigations/treatments in layman terms, and reading between the lines in order to expand on a diag-

nostic line of inquiry. Some of the positive traits mentioned above extend to these para-clinical skills. However, I am extremely cautious about overextending both our expertise and our moral positioning as EMP teachers. Assuming that medical students lack sufficient 'education of the soul' could easily backfire, with the teacher coming across as condescending or morally self-righteous. As long as the MH content is couched in the form of language communication I can endorse an emphasis on MH sensibilities. However, once we start behaving like missionaries, I become deeply uncomfortable with the approach.

To learn more about the MH, I recommend the following three books:

- 1) *Medical Humanities and Medical Education*, by Alan Bleakley. Published by Routledge (2015).

This is, arguably, the most influential publication on the Medical Humanities at the present.

- 2) *English in Medical Education*, by Peih-ying Lu and John Corbett. Published by Multilingual Matters (2012).

This volume of the *Languages for Intercultural Communication and Education* series focuses more on discursive features of clinical English and, as such, probably provides the greatest amount of interest for Asia-based medical English teachers.

- 3) *Medical Humanities: An Introduction*, by Thomas R. Cole, Nathan S. Carlin, and Ronald A. Carson. Published by Cambridge University Press (2015).

As the title states, this is the quintessential basic medical humanities text, consisting of twenty-three chapters each written by invited experts in the field, covering a wide span of humanities topics.

# Involving high school students in medical science exchange programs: Experiences from the University of Tsukuba

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Since 2016, in an effort to strengthen ties with high schools locally and overseas, we began involving high school students in some of our international activities in medical science. The courses were initially developed as a way to encourage a more international outlook in our undergraduate and graduate students and increase their motivation for medical science research and studying English by bringing together students from Japan and partner universities overseas. The addition of high school students into these established programs, while presenting certain challenges, has been largely successful. It has given the high school students a taste of university-level research in medical sciences as well as helping them to forge international friendships with other high school and university students. Furthermore, it has encouraged our university students to take the role of supervisors and teachers. In this report, we will describe the high school students' involvement and achievements in the courses, share some student feedback, and also reflect on our experiences as educators and organizers.

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**Keywords** Exchange programs, medical science, internationalization, high school students

## 1. Introduction

The Faculty of Medicine at the University of Tsukuba has long been involved in efforts towards internationalization, holding numerous domestic and overseas activities and exchange programs designed to attract international students to the university and promote a more internationally oriented mindset in our students. Two of these programs, the Molecular Biology Program for graduate students of medical science held in Vietnam and a two-part exchange program for undergraduate medical science students held in Tsukuba

and either Indonesia or Vietnam, have been previously described in the Journal of Medical English Education.<sup>1,2</sup> We found that such programs, while having some impact on student recruitment, have greatly benefited the participating students in terms of an increased motivation for studying English and their chosen field of medical science. In 2016, we began extending some of our programs to high school students.

Stanford University School of Medicine has a number of high school student-focused programs in clinical and medical science subjects. Their eight-week Stanford Institutes of Medicine Medical Science Program (<https://simr.stanford.edu>) places high school students in medical science laboratories to conduct research alongside Stanford faculty and students with the aims of “increasing interest in biological sciences and medicine in high school students, helping students to understand how scientific research is performed, and increasing diversity of students and researchers in the sciences.” In short, they have two goals: student education and recruitment.

The University of Tsukuba, like all universities, has many

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activities, such as open campus events, to introduce the university to high school students. Our incorporation of high school students into inbound exchange programs designed for undergraduate and graduate students, however, is to the best of our knowledge, unique to the School of Medicine and Medical Science. Like the Stanford program mentioned above, our programs have been effective for student education and recruitment. In this report we will introduce how high school students have been involved in two of our programs, the Summer Research Program in Tsukuba and the Sakura Science Program, and give feedback from the high school students who participated, the university students who worked with them, and perspectives from ourselves as the organizers and teachers of these programs.

## 2. Sakura Science Program 2016

The Sakura Science Program is the second part of a two-part (outbound and inbound) exchange program held at the University of Tsukuba, the first part being held in Indonesia or Vietnam. This program, previously described in detail in the *Journal of Medical English Education*,<sup>2</sup> is designed for undergraduate students of medical science, and brings students from Indonesia, Vietnam, and Taiwan to the University of Tsukuba for eight days to perform medical science research alongside our undergraduate students. In 2016, we invited one of the Ministry of Education, Culture, Sports, Science and Technology (MEXT)-designated “Super Science” high schools in Tsukuba, to send a student to join this program. This student, in her 3rd year of high school joined a 2nd-year undergraduate student in the Laboratory of Stem Cell and Regenerative Medicine, where they carried out a research project under the direction of an Indonesian graduate student. On the final day of the program, the students gave group presentations about their experiments. The students also enjoyed cultural activities, including sightseeing in Tokyo and visits to research institutes in Tsukuba. Subsequently, this student went on to enroll as a medical student at the University of Tsukuba.

## 3. Summer Research Program in Tsukuba 2017

The success of our experience with the Sakura Science Program in 2016, prompted us to expand such activities further and invite high school students from *overseas* as well as Japan to join in our exchange programs. In 2017, we invited six Japanese high school students from three schools in Tsukuba (two from each school), two high school students from

Hanoi, Vietnam, and two from Khon Kaen, Thailand, to join our annual Summer Research Program in Tsukuba. This two-week international exchange, currently in its tenth year, brings around 40 graduate students from partner universities overseas (including the United Kingdom, the United States, France, Taiwan, Vietnam, Indonesia, and Brazil) to do research in our medical science and environmental science laboratories. Briefly, it follows a similar schedule to the Sakura Science Program, with laboratory research, lectures, and educational activities throughout the week, and cultural and sightseeing activities on the weekend, but the longer duration allows the students to go into greater depth with the research and participate in a larger number of activities, such as experiencing traditional Japanese sports, hiking, and barbecues.

The high school students who participated in this program did not join in the research activities alongside the graduate students, but as a group were put into a separate course of study for the two weeks. The first week was spent in the Department of Internal Medicine (Endocrinology and Metabolism) and the Medical Genetics Laboratory, where they learned the basics of human genetics and ethical issues of human genetic research, and performed genotyping of DNA extracted from human samples. The second week they spent in the Bacteriology Laboratory, of the Department of Infection Biology. Here they learned about safe handling of pathogenic bacteria, and experienced fundamental diagnostic techniques to identify them. They also studied molecular mechanisms that regulate expression of virulence factors. During the 2nd week, the students were given recommended reading beforehand and encouraged to study the basics in advance. The recommended reading included the following subjects: Methicillin-resistant *Staphylococcus aureus*, quorum sensing, Gram staining, minimum inhibitory concentrations, reporter genes, biofilms, and biosafety. During the course, the majority of the teaching was largely left to a doctoral student in the Bacteriology Laboratory with support from other graduate and undergraduate students. We were concerned whether the students' English ability was sufficient to fully understand the content.

Regarding the final presentations, the students were divided into two groups; one group was assigned to speak about their lab activities in the first week, while the other spoke about those in the 2nd week. In preparation for these presentations, the participants attended a lecture on scientific presentation skills, and each group had individual training with a member of the university's Medical English Communications Center. The final presentations were made in a lecture hall in front of an audience of students and staff.

## 4. Sakura Science Program 2019

In 2019, six high school students joined the Sakura Science Program from partner university-affiliated high schools in Hanoi (two students) and Ho Chi Minh City (two students), Vietnam, and Kohn Kaen, Thailand (two students). This was our biggest party of high school students from overseas to join one of our exchange programs. These students joined a group of 12 undergraduate students (majoring in biomedical sciences) from partner universities in Taiwan, Vietnam, and Indonesia. Each high school student was put into a group of three together with an undergraduate medical science student from the University of Tsukuba, and an undergraduate student from a partner university. Each group was placed into a different laboratory, where they carried out basic research under the supervision of undergraduate and graduate students from that laboratory. A list of the participating laboratories in which high school students were placed is given in **Table 1**.

The course proceeded as previously described, with laboratory experiments, lectures, cultural and sightseeing activities, and presentations on the final day.

## 5. Feedback and Discussion

### 5-1. High School Students

In order to assess the success of these programs, the participants were invited to submit a short report describing their experience. Of her experience at the Summer Research Program, one Japanese high school student wrote: "Throughout this program, I experienced and learned things that are usually not taught in high school. My dream is to become a medical technologist, and this was my first time to visit the research laboratory of medical science. There were many professors from different laboratories at the final presentation, and they gave us feedback and comments on our group presentation, and I believe that this was a good opportunity to communicate with them."

For this student, her experience during this program was

directly relevant for her career path; however, her sentiment about experiencing and learning things that are usually not taught in high school was also echoed by other students. Regarding her experience of the Sakura Science Program, one high school student from Hanoi wrote: "I was taught which I had never seen before, such as: pipetting, studying effect of samples on protein-protein interactions... I am still a high-school student, everything I had known was theory and it was exciting to see how science be used in life." Another student from Thailand wrote: "In my high school class I learned only about scientific theories and did experiments only on basic subjects. But when I came here I used the skills and sensitive laboratory instruments combined with knowledge."

Bleicher, reflecting on his experience of high school students in carrying out research in university laboratories, came to a similar conclusion, writing: "High school students in non-traditional settings such as university research laboratories are capable of learning both conceptual knowledge and hands-on laboratory skills far beyond the expectations of their teachers. In addition, they developed sophisticated ways of communicating that knowledge to others both informally and formally in presentations."<sup>3</sup> Similarly, Roth et al. in their analysis of a laboratory internship program for high school students, comment on the amount of skill and knowledge that the students developed during the program, stating that this "knowledge was no longer abstract, just to be memorized"; rather the students could understand "why they were doing certain procedures rather than following a recipe-like approach as they had experienced it in their high school science courses."<sup>4</sup> Likewise, in our experience, we found that the high school students were able to adapt to the university research laboratory, begin to grasp the scientific theories and laboratory techniques, and communicate that new knowledge with their partners and professors in a sophisticated manner.

### 5-2. University of Tsukuba Students

As you would expect, the reports from the high school stu-

**Table 1. List of the participating University of Tsukuba laboratories in which High school students were placed during the Sakura Science Program 2019**

Laboratory	Principle Investigator	Research Theme
Laboratory of Immunology	Akira Shibuya, Kazuko Shibuya	Purification and functional analysis of monoclonal antibodies
Laboratory of Molecular Cell Biology	Yasuyuki Suda, Kenji Irie	Yeast Genetics, Molecular Biology, and Cell Biology Post-transcriptional regulation of gene expression in yeast
Laboratory of Experimental Pathology	Mitsuyasu Kato	Analysis of proliferating cancer cells
University of Tsukuba IIS, Yanagisawa/Funato Laboratory	Masashi Yanagisawa	Neuro Science of Sleep
Laboratory of Gene Regulation	Koji Hisatake	Mechanistic analysis of cell differentiation and reprogramming
Laboratory of Regenerative Medicine and Stem Cell Biology	Osamu Ohneda	Investigation of the biology of functional stem cells and its related factors

dents show that they had a very fulfilling and positive experience, but the question remains as to what impact such programs have on the Japanese university students who are working with the high school students. We collected reports from seven University of Tsukuba students who were involved in the Sakura Program 2019. Our analysis of the reports revealed three key areas in which the students wrote of increased levels of motivation or improvement: English communication (n=7), scientific research (n=7), and cultural awareness (n=6). One student wrote: "I was able to experience the frontier research and talk to a lot of foreign country friends in English. So I think that my speaking English skills became strong a little and I got a lot of new friends who are foreign people." Another said: "By this experience, I came to be more interested in research of medical science, and I had decided to do more efforts in order to achieve my dream." One student spoke of how he learned the value of cross-cultural communication: "Conversation in English was very difficult for me. But, to talk with people from abroad was interesting. I found that some common things in Japan are uncommon in Indonesia and Vietnam. And I was surprised that religion and culture greatly affects way of thinking. I would have never noticed these things without having conversation with them. Talking with other country people has significant value."

### 5-3. Educational Reflections

One important educational opportunity that involving high school students in exchange programs affords is allowing undergraduate students to play the role of mentor and teacher. In a typical university laboratory the principle investigator will delegate the supervision of undergraduate students to the graduate students. The programs described here, however, place the undergraduate students in the position of supervisor and teacher. One of the students in his report of the Sakura Science Program wrote, for example: "I had two partners. One was a medical student from Indonesia, the other was a high school student majoring in mathematics from Vietnam. They were unfamiliar with experiments. In the experiment using very little liquid with micropipette, their data had a lot of errors. So, I advised them and showed how to do it. After that, their techniques became better step by step and they could get good data in the last experiment."

According to the Learning Pyramid, which describes how learning retention rates increase as teaching methods shift from passive learning forms (lectures, reading) to more active forms (demonstration, discussion groups), "teaching others" is one of the most effective ways to retain learned information.<sup>5</sup> Thus, playing the role of supervisor or teacher

for high school students, as illustrated by the students' experience above, is a way to leverage this "teaching others" principle for consolidating learned information in our undergraduate students. This is something that we also noted in a previous paper, in which we introduced an outbound exchange program, the Molecular Biology Course, held in Vietnam.<sup>1</sup> This course is largely taught by University of Tsukuba graduate students, who all reported to have *learned* through the *teaching* process, as in the words of one student: "I learned how to explain the experimental method and to answer the scientific questions in an easy-to-understand manner." In the same paper, we also reported how the Vietnamese participants responded positively to the teaching of our graduate students. Peer Instruction, as pioneered by Mazur, has proven to be effective for learner outcomes,<sup>6</sup> and we have found that, when well organized, it can be beneficial for all those involved.

### 5-4. University of Tsukuba Faculty

As organizing faculty of this program, we would like to offer some of our own reflections on involving high school students in our programs. Firstly, high school students tended to express very high levels of enthusiasm; there was a joy in discovery, in looking through a microscope for the first time, in getting good experimental results. This enthusiasm enlivened the atmosphere of the laboratory and made the teaching process more enjoyable. Scientific research projects, as Woolnough asserts, are a "very effective way, possibly a uniquely effective way, of developing core skills in students—especially the core skills of problem-solving, communication, and personal and interpersonal skills."<sup>7</sup> We have been very impressed by what the students were able to achieve during their time working in our laboratories. As can be seen in the students' feedback above, an authentic learning environment—a real laboratory rather than a classroom—has been effective in increasing their enthusiasm for science.

Secondly, in order to attract talented and passionate undergraduates into our School of Medical Science, we are eager to show high school students our willingness to educate future researchers. Involving high school students in such events is a good way to advertise our university and a good opportunity to build relationships between our faculty and high school teachers. Furthermore, it facilitates future activities, such as making visits to high schools overseas for university promotion or educational activities.

Thirdly, we have found some difficulty in selecting students to participate in the program. In the past, we have generally asked the high school teachers to choose the students; in 2019, however, we decided to select students from one of

the Vietnamese high schools based on their applications, the rationale being that we would be able to identify those students who would be best suited for the course and possibly future enrollment into our undergraduate program. Unfortunately, there was no interview as part of the selection process and it was not as effective as we had hoped. Upon reflection, we think it is better to have the assistance of the high school teachers in the student selection process.

## 6. Conclusion

Our experiences with international exchange programs are in agreement with the observations of Janjua, who in her examination of an international exchange program organized at the Kagawa Prefectural University of Health Sciences suggests that “inbound exchange programs, if planned strategically, can have a significant impact on increasing cross-cultural understanding and promoting internationalization at Japanese medical institutions.”<sup>8</sup> The involvement of high school students in our inbound programs, while presenting some small challenges, has been overwhelmingly positive. Considering the students’ reports, we feel encouraged that their participation has been not only beneficial for the high school students themselves, but has also had a significant impact upon the Japanese students who were assigned to work with them. Finally, the enthusiasm and excitement expressed by the high school students involved in our programs has reminded us that at the heart of the university

should be the desire to educate the next generation.

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# Changes in students' perceptions and grit after participating in a study-abroad program

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Since 2006, Showa University has organized a 4-week summer study-abroad program through Portland State University (Oregon, USA) for 1st-year students. To better understand this program's effects on the students, we assessed changes in their reasons for participating, the worries they had about the program, and the personality trait of grit (perseverance and passion for long-term goals). Before participating in the 2018 program, 31 students (10 medical, 8 dental, 9 pharmacy, and 4 nursing and rehabilitation sciences; 13 males, 18 females) completed a questionnaire and rated several reasons/worries on a 5-point Likert scale; they also rated their grit on a previously validated scale from the psychology literature. After the program, the students completed another questionnaire and again rated their reasons/worries and grit. Before the program, the students' top reasons for participating were to interact with foreigners (MN=4.7), experience foreign culture (MN=4.6), improve their English (MN=4.6), and enhance self-development/growth (MN=4.5). Afterwards, the following reasons were rated significantly higher: unique opportunity, parents' recommendation, and future career benefits. The top worries at the start of the program were English ability (MN=3.9), staying with a host family (MN=3.5), and security (MN=3.2). Afterwards, each of these worries was either rated at the same level or lower; English ability (except for medical and dental students), dorm life, and staying abroad were rated significantly lower ( $p < .05$ ) after the program. Regarding grit, different levels were observed among the 4 schools. Additionally, post-program ratings for the grit subscale "perseverance of effort" correlated significantly with greater agreement to the item "I changed". Although limited by a small sample size, these preliminary results suggest some of the changes in perception that occur while studying abroad. Follow-up assessment of these students is also discussed.

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**Keywords** study abroad, comprehensive medical university, motivation, worries, grit

## 1. Introduction

Japanese university students have shown a growing interest in studying abroad, with reasons such as desiring intercultural experiences, improving English language skills and gaining a more global perspective.<sup>1</sup> Many Japanese medical schools have experienced a similar trend in their students, who want to develop their English clinical communication skills in areas such as patient interactions and case presenta-

tions.<sup>2</sup> Since 2006, the International Exchange Center at Showa University has offered a "Healthcare in USA Program" for first-year students from all four schools (medicine, dentistry, pharmacy, and nursing and rehabilitation sciences).

### 1.1. Healthcare in USA Program

This program is organized through the International Special Programs at Portland State University (PSU), an urban college located in downtown Portland, Oregon, which is located in the Pacific Northwest, USA. It lasts approximately four weeks every summer, and students stay both with a local host family and then in the PSU dormitories. Students participate in a variety of activities that are designed to cover one or more of the following program goals: Global Communication, Comparison of Health-Care Systems, and International Culture Exposure. Common activities include attending English as a Second Language (ESL) classes, exploring downtown Portland, river rafting, seeing a professional soccer game, visiting local hospitals and clinics, experiencing the

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simulation and training centers at Oregon Health and Science University (OHSU), and volunteering at a local homeless center.

In our previous report, we examined students' reasons for participating in the 2017 program, and main worries they had. We found that the main reasons for participating were to improve English skills, to promote self-development/growth, and to learn about a foreign culture, while the main worries were language skills, homestay, and living abroad in general.<sup>3</sup> In this report, we extend the previous results by assessing possible *changes* in students' perceptions about the program by examining their reasons for participating and worries both before and after the program, and also by studying possible social-cognitive effects of this program – specifically, increased levels of grit (perseverance of effort combined with the passion for a particular long-term goal or end state).<sup>4</sup>

## 1.2. Introduction of Grit

The psychological construct of grit was first developed by Dr. Angela Duckworth in 2007.<sup>4</sup> She was interested in understanding why some people perform better than their scores on ability tests would predict. Her conclusion was that these people were high in “grit”, which includes 2 important components: perseverance and passion for long-term goals, and consistency and commitment to those goals in spite of failures. Research into grit has documented that it is related to several positive academic and career outcomes, such as higher Grade Point Average (GPA), higher attained education, and higher success in maintaining a job.<sup>5,6</sup> Additionally, there are claims that one's experience can affect grit and that grit can be taught.<sup>7</sup> Therefore, in this report we examined whether travel abroad experiences might affect grit levels in our students.

## 2. Methods

### 2.1. Participants

A total of 31 students (13 males, 18 females) participated in the 2018 “Healthcare in USA Program”. Students from all four schools participated (medicine = 10, dentistry = 8, pharmacy = 9, and nursing and rehabilitation sciences = 4). Students were selected via an interview process that assessed their motivation and screened for any health conditions (such as severe allergies) that may have prevented them from participating in the program, especially the homestay component; a specific English test score was not a requirement for participation.

To prepare for the program, students were required to

attend two homestay orientations, a safety and crisis management seminar, and a pre-departure orientation. At the homestay orientations, students learned about their host family's responsibilities (providing 3 meals per day, spending time together during dinner and weekends, etc.) and their own responsibilities, such as being flexible and open-minded to new experiences, and engaging with their host family whenever possible. At the homestay orientations, we also stressed the importance of “speaking your mind” in America and went through various scenarios and strategies for avoiding communication problems with their host families and others. At the safety and crisis management seminar, officials from a crisis management company and insurance company gave a lecture about personal safety and travel health insurance. Finally, at the pre-departure orientation, students received a full debrief about what to pack for the trip, rules/regulations regarding luggage and carry-on items, immigration information, and a final overview of the program rules and information.

### 2.2. Pre-Program Questionnaire

Approximately 1-3 days before departing for America, students submitted a questionnaire that they received electronically two weeks prior. This questionnaire assessed a variety of topics, including reasons for participating and worries about the program, and was slightly modified from the 2017 program.<sup>3</sup> In particular, they rated 10 possible reasons for participating and 10 possible worries on a 5-point scale from 1 (“not at all applicable”) to 5 (“very applicable”). They also completed a previously validated scale of grit from the psychology literature. One student failed to submit a completed questionnaire.

### 2.3. Grit Assessment

In this report, we used the Short Grit Scale (Grit-S), which is a reduced version of the original 20-item grit scale developed by Dr. Duckworth and her colleagues.<sup>5</sup> The Grit-S contains 8 items that measure “consistency of interest” and “perseverance of effort”. Students rated each item on a 5-point scale from 1 (“not at all applicable”) to 5 (“very applicable”). Previous research on the Grit-S has been shown to be an internally valid and reliable assessment.<sup>5</sup>

### 2.4. Post-Program Questionnaire

On the last day of the program, students were given another questionnaire to be submitted approximately 1 month after returning to Japan. In this questionnaire, students evaluated their level of achievement or opinion for each of the 10 reasons they rated in the pre-program questionnaire, as well



as how much they actually experienced each of the 10 worries from that questionnaire. We also included three items about their experiences studying abroad: Could they adapt to American culture? Did they change? Did they experience any trouble or problems? Finally, they also completed the same S-Grit scale, but with the items in a different order to reduce the likelihood that students would remember their previous responses.

## 3. Results

### 3.1. Reasons for Participating

**Figure 1** shows pre- and post-program comparison for each reason. As this figure indicates, students' top reasons for participating at the beginning of the program were to make foreign friends (MN=4.7), experience foreign culture (MN=4.6), improve their English skills (MN=4.6), and enhance self-development/growth (MN=4.5). However, all of the possible reasons were rated higher in the post-program assessments than they were before the program, except for the one regarding their expectations of improved English after skills. A two-way repeated measures analysis of variance (ANOVA) with time (pre-, post-program scores) as the within-subjects variable, and school (medicine, dentistry, pharmacy, and nursing and rehabilitation sciences) and sex (male, female) as the between-subjects variables showed significantly higher ratings in the post-program assessments of the following reasons for participating: this program offered a unique opportunity (Wilks' Lambda = 0.77,  $F(1,23) = 6.74$ ,  $p = 0.016$ ), it was helpful for their future career (Wilks' Lambda = 0.45,  $F(1,22) = 27.3$ ,  $p = 0.00$ ), and they were glad of their parents' recommendations (Wilks' Lambda = 0.82,  $F(1,23) = 5.18$ ,  $p = 0.032$ ).

### 3.2. Worries about the Program

**Figure 2** shows students' ratings of the list of possible worries before and after participating in this study-abroad program. The top worries at the start of the program were English ability (MN=3.9), staying with a host family (MN=3.5), and security (MN=3.2). After completing the program, all worries were rated either at the same level or lower than before the program. Specifically, two-way repeated-measures ANOVA indicated that English ability (Wilks' Lambda = 0.73,  $F(1,23) = 8.57$ ,  $p = 0.008$ ), dorm life (Wilks' Lambda = 0.75,  $F(1,23) = 7.55$ ,  $p = 0.011$ ), and living abroad (Wilks' Lambda = 0.84,  $F(1,23) = 4.31$ ,  $p = 0.049$ ) were rated significantly lower after the program. However, a significant school x time interaction was also found for English ability (Wilks' Lambda = 0.71,  $F(3,23) = 3.07$ ,  $p = 0.048$ ). As **Figure**

**3** shows, the pharmacy, and nursing and rehabilitation sciences students were much less worried about their English ability after the program, while the medical and dental students' ratings did not change noticeably.

### 3.3. Grit

The same two-way repeated-measures ANOVA described above was used to examine changes in pre- and post-program scores for the grit subscales of "perseverance" and "consistency". No significant differences between pre- and post-program scores were found for either subscale (**Figure 4**). In addition, there were no significant main effects for school or sex, or any interaction effects. However, there was a trend in the data suggesting differences in the perseverance subscale among the 4 schools. Specifically, medical students had marginally higher scores (MN = 3.25) than nursing and rehabilitation sciences students (MN = 2.79). In addition, post-program perseverance scores were significantly and positively correlated with the item "I changed" after completing this study-abroad program (Pearson  $r = 0.50$ ,  $p < 0.005$ ); Interestingly, pre-program perseverance scores were *not* significantly correlated with this item.

## 4. Discussion

Replicating the results from our students in the 2017 program, the 2018 students had a variety of reasons for participating in this program, but the main ones were to improve their English, experience a different culture where they can make friends, and gain a more global perspective. Their sentiments are also consistent with past research on students' impressions of studying abroad, indicating that they often have a variety of reasons ranging from practical (improving foreign language skills) to transformational (global perspective, experiencing new cultures).<sup>8,9</sup> On the other hand, English ability was also a major source of worry before participating in the program, but these results show that after actually participating in our program, students' problems with English and the majority of their worries were lower than they previously rated them. This pattern of evaluation is consistent with research from the judgement and decision making and health psychology field, which has shown that worry and focalism can lead people to over-estimate negative future events.<sup>10,11</sup> For organizers of study-abroad programs and medical English opportunities, this can be a serious problem if students become unrealistically pessimistic about their English ability while studying abroad, such that they decide not to participate in these activities at all. As educators, we should consider how to reduce these overly negative fears of

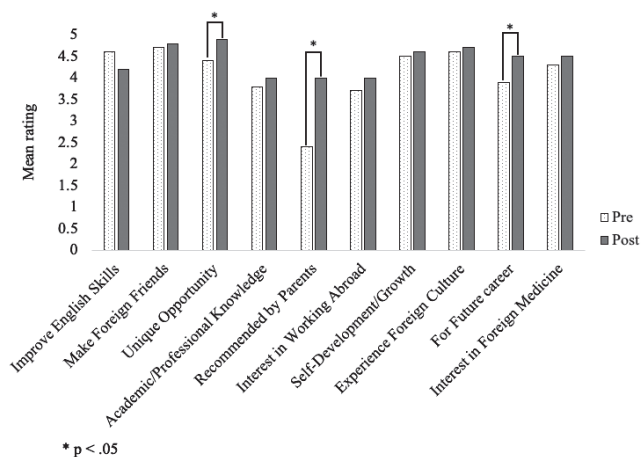


Figure 1. Changes in students' ratings of reasons for participating in the 2018 program before (n = 31) and after (n = 30) participating

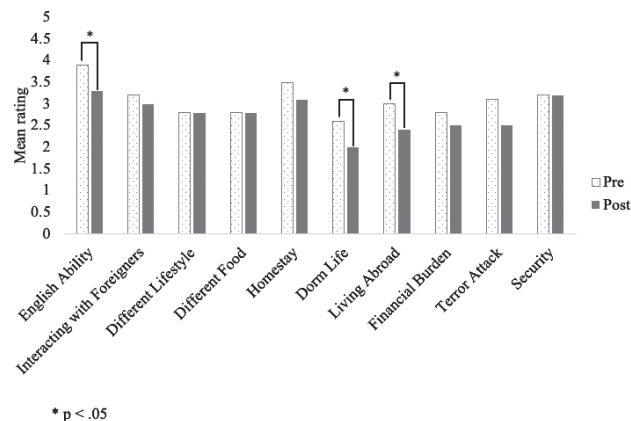


Figure 2. Changes in students' worries about the 2018 program before (n = 31) and after (n = 30) participating

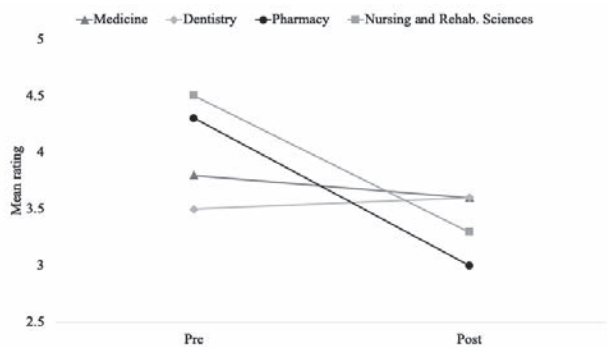


Figure 3. Examination of school x time interaction for students' worries about English ability

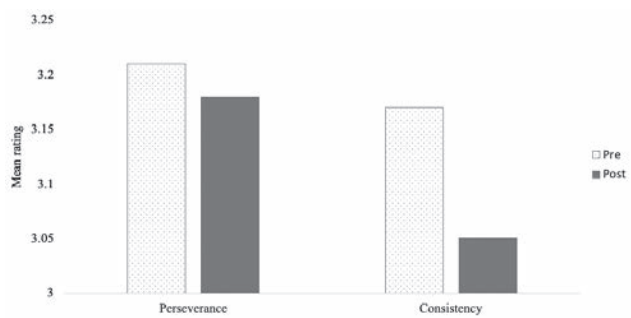


Figure 4. Changes in students' "perseverance" and "consistency" grit subscale scores in the 2018 program before (n = 31) and after (n = 30) participating

studying abroad so that students' other more positive motivations for improving their English and self-growth can come through.

Finally, this report found no significant change in students' grit after participating in our program. However, the significant correlation between post-program scores from the perseverance subscale and the item "I changed" does offer some evidence that deeper internalization of studying abroad might lead to more positive effects on students' grit. Our report also found some intriguing evidence of different levels of grit among our four schools. We are unaware of any published reports from western countries that have found a similar result, which may suggest some unique aspect of the Japanese medical educational system might be driving this effect. However, these results are limited by a small sample size (only 4 nursing and rehabilitation sciences student were included), so we must emphasize that these are just preliminary findings, and we will follow up by collecting more data in the future.

In conclusion, students overall rated this program very

positively and most overcame their initial worries about studying abroad. As a study-abroad program for first-year students, this is often our students' first chance to speak English in an English-speaking country and learn about medicine in a global context. As such, we plan to continue to follow-up these students and examine the long-term benefits of this program. We are particularly interested in examining whether this program might influence students' decisions to participate in other study-abroad opportunities when they become upper classmen, as well as their future career choices.

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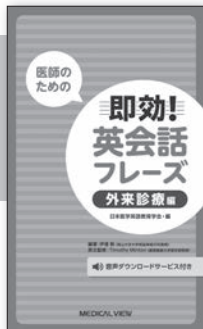
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医師が英会話の必要性を強く感じる「外来診療」「国際学会」という2つの場面の流れに沿って、細かくシチュエーションを区切って英会話フレーズをまとめた、音声ダウンロードサービス付きの英会話書籍。日本語ではごく簡単な表現も、英語で伝えるとなると出てこない表現は多い。それらは「決まり文句」ともいえる表現なので、知っていれば驚くほどスムーズな意思疎通ができるようになる。本書は、それぞれに特有の表現を日英併記で掲載。知りたい英会話フレーズをすぐに見つけることができる。

## 外来診療編

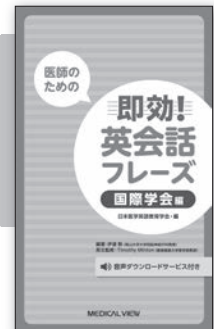
- ▶ 患者さんへの挨拶から始まり、問診、身体診察、検査指示、診察結果の報告まで



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## 国際学会編

- ▶ 発表データの確認など受付で使う表現から、演題発表、ポスター発表、座長としての進行、質疑応答、懇親会でのソーシャルな表現まで



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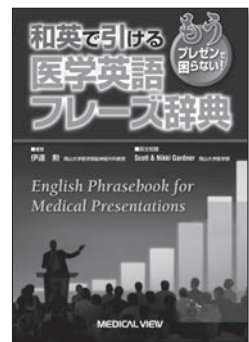
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# 和英で引ける 医学英語 フレーズ辞典



著者

伊達 勲  
岡山大学大学院脳神経外科教授



学会発表や論文でよく使われる英語フレーズを和英で紹介。日本語原稿から英訳する際にも和英辞典的に活用できる。またプレゼンテーションの流れに沿った構成なので、初心者でも目次を眺めるだけで全体の流れを把握できる。英語での口頭発表・論文執筆に必携の一冊。

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目次

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謝辞・自己紹介・冒頭の挨拶/タイトル・目的を述べる/背景を述べる (1): 関連する従来の研究を紹介する / (2): 病態の傾向を紹介する / (3): 治療法の現状を紹介する / (4): 治療上の問題点を紹介する / 具体的な論点 (わかっていないこと) を挙げる / 方法論を紹介する / 今回の発表のゴールを示す

### Part 2 Materials/Patients&Method

症例報告 (1): 来院の経緯 / (2): 病状・主訴、

診断までの経緯 / (3): 検査所見 / (4): 診断結果、治療方針 / (5): 治療の実施、治療結果/臨床研究 (1): 患者の定義 / (2): 患者数、内訳 / (3): 治療方法 / (4): 評価方法 / (5): 解析方法/基礎研究

### Part 3 Results

図表で示す / 結果を説明する / 数値を挙げて比較する / 統計学的有意性を述べる

### Part 4 Discussion

他の報告と比較する / 従来の定説を紹介する /

現在の治療法を紹介する / 所見・病態を説明する / 問題を提起する / 明らかになったことを示す / 仮説・推論を提示する / 重要点・注目すべき点を示す / 議論を展開する / 自説の問題点を提示する / 今後の課題を示す / 研究の概要をまとめる / 結論を示す

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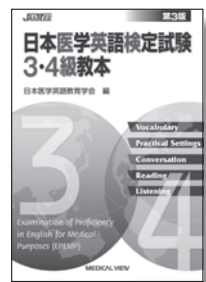
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