

Reflections on an EMP (English for Medical Purposes) Project

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In this article, we document and reflect on an EMP project to supplement the provision of medical English for undergraduate students in Hiroshima University's medical school. The stages of the project are dealt with chronologically, and we describe how, within its overall aims, initial plans were altered as the project and accompanying understandings of medicine and medical English developed.

In the final part of the article we consider some of the key features of the EMP research in light of English for Specific Purposes (ESP) theory. In particular, we consider the similarities to and differences with General English (GE), how the two are related, and how the EMP project may develop in the future.

ORIGINS

In 2012, Hiroshima University's medical school enquired whether the Institute for Foreign Language Research and Education could supplement the existing medical English teaching to its undergraduate students, particularly in relation to productive skills. At the time, students received four general English courses in their first year of study, one general English course in their second year, and transitioned to an English for Specific Purposes course in their third year, taught by the medical school's English specialist.

Discussions resulted in the planning and teaching of an intensive course, taught by four members of the institute, and summarized in a previous article (Davies, Fraser, Lauer, & Howell, 2013). To focus on productive skills, the course was divided into three parts: medical conversations, medical discussions, and summary writing. Medical conversations were considered to be doctor-patient interactions, and medical discussions were planned to focus on an aspect of medical ethics. Summary writing was to focus on bacterial and viral diseases. The teaching team constructed materials using a variety of resources, including extracts from commercially produced CDs, DVDs, and Wikipedia articles. In relation to two Wikipedia articles on tuberculosis and Ebola, a small glossary was constructed using corpus analysis software to aid students with comprehension. In addition, other members of the teaching team added what they considered to be important words from each unit. The resulting word list consisted of 380 items.

The course was taught intensively over a four-day period in September 2012, and included evaluation tasks in the form of a word test and written summaries of the article on Ebola. Students also completed a feedback questionnaire, and the results of this were encouraging. The surprise was that the highest feedback score was given to the glossary. When the medical school asked that the course continue into a second year, a small team was created within the institute to conduct research into building a pedagogic word list and learning materials.

INITIAL PLANNING

The initial plan for the research was a linear one, involving the construction of a pedagogic word list followed by the design and development of materials that included the words on the list.

Word list development was planned along the lines of Fraser's (2009) pedagogical medical word list for pharmacology. This consisted of 2,000 items, and was of a similar manageable size to West's (1953) general word list. Fraser's word list had been constructed from 100 pharmacology journal articles, and the pedagogic medical word list was to be developed in the same way. To do this, it would be necessary to divide the medical field into ten broad areas and then choose a selection of articles from each area. These articles would be used to create a corpus, and the items for the word list would be chosen on the basis of frequency and range across articles. After creating the word list, materials would be designed that embedded the items from the word list within them.

NEEDS ANALYSIS

At the beginning of the research, a needs analysis was undertaken in the form of semi-structured interviews with three senior members of the medical school (Davies, Fraser, & Tatsukawa, 2014). They were asked about the following areas:

1. Organization of the medical school and areas of specialism
2. Stages in the education and training of medical students/young doctors
3. Interviewees' views on the English that students should learn
4. Medical practitioners' use of English
5. Key reference books and journals

In relation to the results of the interviews, the most revealing areas were 2, 3, and 5. In particular, responses to 2 and 3 were highly linked, indicating some desire for the development of a parallel syllabus, in which students learned English related to their medical studies in Japanese; medical students initially study anatomy, physiology, and biochemistry, and then take a variety of medical lectures in their third and fourth years. When asked what English students should learn, all interviewees stressed the importance of anatomy, with further suggestions being physiology, biochemistry, medical examinations, and basic medical diseases (taken to mean well-known medical diseases). Another key aspect of the interviews was that medical reference books were clearly considered to be important. A meeting between senior members of the medical school and the research team indicated that analysis of medical research books was, in their view, more beneficial in relation to third-year students than an analysis of articles.

A very important aspect of the project, starting at this stage, was the input of medical specialists, which became a feature throughout all stages of the project. The support given by medical specialists within the medical school and also by specialists at a nearby hospital gave the project an enormous lift, and helped greatly to improve the accuracy and content of course materials.

FUSION

Given that anatomy had been stressed in three separate interviews, a decision was taken within the

research team to switch from an analysis of journal articles to an analysis of an anatomy textbook: *Gray's Anatomy for Students*. The analysis was achieved by scanning the pages of the textbook to create a corpus and using Laurence Anthony's (2014) software program *AntConc*. The same process was used to create a second corpus from *Harrison's Principles of Internal Medicine*.

At the same time that the corpus analysis was started, some very basic anatomy materials were trialled as part of a general English receptive skills course for a mixed group of students on the medical campus. Some of the medical students among them then described the books they used to study, such as *Netter's Atlas of Anatomy*. Of particular interest was their dissection book. Although written in Japanese, it contained both Latin and English terms, and occasionally German terms, indicating that students were exposed to medical English terms. However, these were simply added to Japanese sentences, appearing in italics after Japanese terms, and never seen contextualized within English discourse.

At this stage in the process, it became clear that the strategy of the project needed to change. The original plan had been to build a corpus, then construct a word list, and finally design materials. Had the materials been oriented towards article writing, then this might have been possible, but with third-year students, from a discourse perspective, they needed to develop an ability to work with reference texts which explained various aspects of medicine. Article writing takes place later in the medical curriculum, requiring a background knowledge which at the students' level of study they did not have.

Major concerns were how to construct units of material around a theme, and how to embed a word list. The solution to this problem lay more with discourse than with vocabulary, and was aided by the corpus aspect of the research. In planning the original corpus of articles, the research team had asked the medical faculty to divide the entire medical field into ten broad areas. A senior medical doctor had supplied the following list:

cardiovascular medicine; digestive medicine; respiratory medicine; neuromusculoskeletal medicine; infectious diseases and immunology; oncology; developmental medicine; nephrology and endocrinology; critical care and anesthesiology; sensory organology.

What became clear from the list was that many of the items were associated with body systems. For example, cardiovascular medicine was clearly linked to the circulatory system and digestive medicine was linked to the gastrointestinal system. Units of material could therefore be constructed on the basis of body systems and diseases associated with them. Corpus analysis would be used for the purposes of checking for gaps in the materials and editing to ensure that high-value words were included in the units. High-value words were considered to be those which have high 'keyness' (i.e., they occur relatively more frequently in our corpus than in a general English corpus), have wide distribution throughout the corpus, or are conceptually important.

EARLY DESIGN

Materials

The construction of new course materials took place in 2014, and involved questions both of content and of methodology. Given that an original aim of the institute's medical English course was to help students

develop productive skills, the materials needed to build towards either speaking or writing tasks, while also offering students the opportunity to experience terms in context. Early on, a decision was made to use American English for the materials. This was because students were more familiar with American English spellings for technical terms, and they were also often simpler than their British English equivalents.

As we noted earlier, a key part of the original course was medical conversations, mainly concerned with doctor-patient interaction. In the 2012 course, role plays based on an example conversation had been used successfully, and so incorporating these into the material was a straightforward way of promoting speaking skills. To achieve this with a trial unit of material, a neurosurgeon working at a hospital near the university's Saijo campus was asked to provide four medical problems associated with the brain. These were a *cerebral aneurysm*, *brain tumor*, *chronic subdural hematoma*, and *subarachnoid hemorrhage*. Having fixed the medical problems for the unit, the relevant anatomy was identified and contextualized in a short essay (300 words approx.), and the medical problems were explained in a second essay (500 words approx.) To create further opportunities for speaking, two sets of short discussion questions were used for warm-up sections, and a section oriented towards orally explaining the relevant anatomy was added along with a doctor-patient medical conversation and role plays. The finished unit consequently had a balance between receptive and productive skills. Three more units on the digestive system, musculoskeletal system, and cardiovascular system were produced on this model. In relation to encouraging writing rather than speaking, two more units were produced: the pulmonary system and endocrine system. Because these units were oriented towards summary writing, the second essays on medical problems were lengthened and focused on single diseases: *tuberculosis* (pulmonary system) and *diabetes mellitus* (endocrine system); conversations and role plays were omitted from these units.

In 2015, two further units of material were created for the English specialist on the medical campus, one on the lymphatic system, and one on the liver. These did not include role plays. Instead, a task was included that involved the writing of new conversations.

Corpus Analysis and Vocabulary

While the early materials were being constructed, corpus analysis was used to make some of the collocations more natural and to add terms. For example, in the unit on cardiovascular medicine, important terms such as *systole* and *diastole* were added. In addition, improvements in collocations were made. For example, the phrase "From it the blood *passes* into other arteries" was changed to "From it the blood *flows* into other arteries" (Fraser, Davies, & Tatsukawa, 2016).

A review of the most frequently occurring words in *Gray's Anatomy for Students* indicated a major omission in relation to positional terms such as *anterior*, *posterior*, *superior* and *inferior*. These terms are introduced in the very early sections of *Gray's Anatomy for Students*, taking up just two pages in a 1,156-page book. However, with corpus analysis, they immediately stood out as a group. The following pages in the book had a focus on imaging techniques such as radiography (simple X-ray imaging), ultrasound, computed tomography (CT-scanning), magnetic resonance imaging (MRI), and nuclear medicine imaging, so a self-study unit was created that focused on anatomical planes, terms of location, and imaging. It was designed as a unit that could be studied prior to the start of a course.

Delivery

The new materials in 2014 consisted of one self-study unit and six classroom units, along with a newly constructed glossary consisting of 567 words in contrast to the 377 words of the first list. The new materials were first used in 2014 on that year's September intensive course, and the same system was used in 2015. This effectively created much more integration within the medical conversation units and between the 'medical conversations' section and the 'summary writing' section of the course. Also, the construction of the units, oriented towards explanations of anatomy, physiology, and common diseases, provided a much better platform for creating a vocabulary test. This was designed as a multiple-choice test, and combined with a mark reader, created a time-effective way of testing the students.

MID-TERM INNOVATION

Creating Online Material

One of the challenges for teaching English for Medical Purposes was the relatively small amount of time that was allocated to such classes. At Hiroshima University in 2015, English learning at the undergraduate level involved two years of general English classes, and just one year of EMP classes in the third grade. This did not seem to be enough for a basic grounding in such a complex area as medical English, and the research team started to orient research towards online materials (Fraser, Davies, Tatsukawa, & Enokida, 2017).

Given that medical students were learning a great deal in their second year of study, particularly in relation to gross anatomy through dissection and lectures, and histology through lectures and slides, as well as physiology, the research team initially planned to orient the materials towards these areas to give students the opportunity to learn medical English that paralleled their studies. In the early stages of this phase of the research, the team experimented with a unit of material on the urinary system, as well as materials on the musculoskeletal system.

In relation to the urinary system, the trial material was structured in the same way as the early sections of the 2014 materials, matching anatomical terms to diagrams, then contextualizing key terms in an essay, along with comprehension questions.

With the musculoskeletal system, the trial materials were used in conjunction with corpus analysis to extend the number of anatomical terms in the existing unit on the musculoskeletal system. This unit presented the most problems in relation to covering important terms. For example, terms such as *foramen* and *process* were not properly covered, although they were regularly appearing terms in *Gray's Anatomy for Students*. Similarly, the *vertebrae* were collectively referred to as the *vertebral column*, but this did not seem sufficient. Consequently, materials were designed that would help students to match key terms, using diagrams and short paragraphs, covering the *cervical vertebrae* (*atlas vertebra* and *axis vertebra* CI, CII; typical *cervical vertebrae* CIII—CVII), the *thoracic vertebrae* T1—T12, the *lumbar vertebrae* LI—LV, and finally the *sacrum* and the *coccyx*. To these were added parts of the essay from the musculoskeletal unit. For these materials, the paragraph, rather than the essay, was used to explain aspects of anatomy. Once the material had been prepared, it was placed on the university's learning management system (LMS) – Blackboard 9 (Bb9).

This early research into online materials brought to the surface a number of important issues. The first was the need for diagrams. Here, the research team experimented with creating its own diagrams in relation

to the urinary system, but this proved to be too time-consuming. The question of where to obtain technical diagrams was solved by an exploration of the commercial website Shutterstock, which could provide medical diagrams at a reasonable price.

The other issues related to the time it would take to create purely online materials for self-study in relation to how often they would be used, and how the materials would connect with the third-year medical materials. One of the advantages of the third-year materials was that they built from anatomy and physiology into diseases. Consequently, students studied key structures within a body system, their purpose, and how they could go wrong, as a set of interrelated topics. Anatomy terms often appear in disease words. For example, in the Central Nervous System unit, students studied the *meninges* (sheets of tissue that cover the *cerebrum*): the *dura mater*, the *arachnoid membrane*, and the *pia mater*. Two of the medical problems they studied were a *chronic subdural hematoma*, and a *subarachnoid hemorrhage*. It was relatively straightforward to show the links between the medical problem words and the anatomical terms. Similarly, within the heart unit, students studied the valves of the heart (*tricuspid valve*, *pulmonary valve*, *mitral valve*, *aortic valve*), and two of the medical problems were *aortic valve stenosis* and *mitral valve regurgitation*. The third-year integrated materials created more opportunities for students to see links between medical terms. This would not happen with materials that were only based on anatomy and physiology. Also, creating materials for second-year students that to some extent copied the first parts of the third-year materials, and which would then be studied again in the third year, seemed to be an unnecessary duplication.

The dilemma was resolved through external developments. A conference presentation on flipped learning offered the possibility of combining online study with classroom teaching. At roughly the same time, the medical school enquired whether it was possible to make the September medical intensive course more cost-effective. As the new direction of the research was towards online materials, the solution was to create a flipped learning course, orienting the online materials towards third-year students (Enokida, Fraser, Davies & Tatsukawa, 2018). The vocabulary tasks, essays, and comprehension questions were placed online for study prior to the classroom component of the course, and the six units of material that had required between 750 and 810 minutes of teaching per student were now taught in 420 minutes.

FINAL STAGE

As the word list was linked to materials development, with the word list embedded in the materials, in the final stage of research and development, materials and a word list were completed. To use these with students, the institute team and medical school's English specialist joined forces to create an integrated syllabus and materials. Also, a review of the current materials, and a discussion with a neurosurgeon on key terms in the neurosurgical/neurological field (Fraser, Davies, Tatsukawa, & Enokida, 2019) led the research team to conclude that a major omission was words describing treatment. To remedy this, a self-study section was planned for each unit of material to introduce key terms that were also linked to some of the medical problems described in the unit.

The total number of units was extended primarily on the basis of body systems. The medical specialist had already used material on the lymphatic system and the liver. To these were added units on the integumentary system, the urinary system, the reproductive system, the eye, and the ear/nose/throat (see appendix).

A further issue related to the best time to teach the material. As noted earlier, one concern was that

starting medical English in the third year was rather late. The research team had been working on the basis of a parallel syllabus, trying to ensure that students had covered the key medical English terms in Japanese through their medical studies. With students' main study of anatomy and physiology taking place in their second year, and study of common medical problems being covered in their third year, the materials to some extent fulfilled this aim. However, there were also deviations from this. Students did not encounter patients until much later in their medical studies, but the materials included doctor-patient dialogues. The justification for this was that doctor-patient dialogues were important, and the dialogues themselves used a more everyday English that the students had learned in their general English studies. The inclusion of doctor-patient dialogues in the materials also offered a contrast between the more technical doctor-doctor English and the more everyday doctor-patient English. Non-technical terms such as 'collar bone' and 'breastbone' could be introduced in these sections in contrast to the technical terms *clavicle* and *sternum* used in doctor-doctor interaction. Similarly, 'throw up' was introduced as an everyday term a patient might use instead of the more dual use *vomit*. The role-play sections of the material, while limited, offered the students the chance to try out some key expressions and phrases, and as these interactional tasks were tied into the descriptions of diseases in the medical essays, they offered an incentive for students to re-read key sections of them.

The role of a parallel syllabus was to enable students to use their schematic knowledge from their medical studies to connect with the English material in the course. While second-year students had not studied the medical problems in the EMP material in their own medical classes, the actual content of the medical essays was quite basic, often describing and explaining the medical problems and listing symptoms and risk factors. The key question was whether students could cope with the medical English section in their second year. To research this, an experiment was set up to trial the material with second-year students. An elective course was advertised for October and November of 2018, covering the same seven units as the September intensive medical English course but with 90 minutes allocated to each class (540 minutes). The course produced almost the same results as third-year course, with no significant difference between quantitative test scores. Of the 34 students who started the second-year course, 31 completed it. Based on these results, in 2019, the same course was offered, but with much earlier advertising and clearer staging for online study, giving students the opportunity for studying during the summer vacation. In total, 75 students joined the course.

The project has resulted in a set of 14 units of learning material for EMP, primarily structured around body systems, with an embedded word list of approximately 1,750 words. This list is currently being structured into a glossary, with terms apportioned to the 14 units, listed along with semantically related terms, as well key word parts are also listed, illustrated with words from the glossary.

DISCUSSION

In our previous sections we have discussed the evolution of courses, medical English word lists, and materials. Here, we examine some of the key features of our EMP research, particularly in relation to background theory concerning register and discourse. We then discuss the relationship between general English and EMP, as well as how EMP could be developed to create an integrated curriculum.

Several authors (Hutchinson & Waters, 1987; Dudley-Evans & St. John, 1998; Anthony, 2018) have written about English for Specific Purposes (ESP). Hutchinson and Waters argue that there have been

several phases in the development of ESP. The first stage, they note, was that specialized areas had different registers, and the aim of research on ESP was to “identify the grammatical and lexical features of these registers” (p.10), using them for their syllabus. The example given is Ewer and Latorre’s (1969) *A Course in Basic Scientific English*. Hutchinson and Waters point out that there were no special forms of grammar that were independent of general English. However, they argue that there were certain forms that were not sufficiently covered in general English textbooks for schools. This stage was then superseded by what they describe as rhetorical or discourse analysis, which had a focus on the combining of sentences to form meaning. The third stage involved a consolidation of the two stages through a focus on needs analysis, labelled by Hutchinson and Waters as target situation analysis, in which the situations where the language will be used are identified and their language features are then analysed. The fourth stage is identified as the skills and strategies that underlie language use, and the fifth stage is focused on a learning-centred approach. Dudley Evans and St. John also examine the history of ESP, and provide a similar analysis, but emphasise four stages: register analysis, rhetorical and discourse analysis, analysis of study skills, and analysis of learning needs. Anthony (2018) lists four pillars of ESP: needs analysis, materials and methods, learning objectives, and evaluation.

For our project, a key issue has been the development of a syllabus, in this case a scheme for teaching, embodied in a set of materials and a word list. The syllabus itself involves a hierarchy of aspects that to some extent reflect of the history of ESP. As we have noted, in summarizing the project above, the organizing and unifying principle has primarily been body systems, which allow for an initial focus on both anatomy and physiology. Many of the different specialisms of medicine are linked to specific body systems.

In terms of dividing a unit, a division is made between anatomy/physiology and medicine, and within medicine a division is made between technical medical English and everyday English through the use of essays and doctor-patient dialogues.

Medical Discourse and Lexis: Comparison with English for General Purposes

Within the units of material there is a strong link between lexis and discourse, unified through a focus on body systems so that items are often seen in context more than once in a unit. Within EMP, there are at least two different registers. There is the highly technical discourse that is used between medical doctors, and the more everyday English used between doctors and patients. Consequently, a medical doctor, when talking to a patient, must be able to use clear non-technical language, or at least explain non-technical terms. While both registers can present challenges, the more difficult of these is undoubtedly the technical one and in terms of grammar and vocabulary, the following extracts highlight some of the comments made by Hutchinson and Waters. In extract 1 and extract 2 below, the nouns and their accompanying adjectives have been removed.

Extract 1: nouns and their accompanying adjectives have been removed

The **X X X** is the **X X X** and is separated from the **X** forming the **X X** by an **X X (X. X.X.X)**. Superiorly, it is continuous with the **X X X** of **X X X** at the **X X** of the **X**.

Extract 1 is taken from *Gray’s Anatomy for Students*. Without the nouns, most of the phrases can be understood.

The problematic term is ‘superiorly’, which is a highly specialized use of the word. While in general English ‘superior’ usually has the meaning of ‘better’, in medical English its meaning is purely locational – ‘above’ in relation to the standard position of the body (the anatomical position). The nouns with their accompanying adjectives are much more difficult:

Extract 1: nouns with their accompanying adjectives

spinal dura mater

outermost meningeal layer

bones

vertebral canal

extradural space

Fig. 2.5.1.

inner meningeal layer

cranial dura mater

foramen magnum

skull

When the nouns with their accompanying adjectives are examined, there are a number of key issues. In terms of lay-technical language understandable to the non-specialist, two terms can be understood: *bones* and *skull*. The remaining terms are too specialized.

Extract 1: Gray’s Anatomy for Students (p.103)

The **spinal dura mater** is the outermost meningeal layer and is separated from the bones forming the vertebral canal by an extradural space (Fig. 2.5.1.) Superiorly, it is continuous with the inner meningeal layer of cranial dura mater at the foramen magnum of the skull.

In extract 2, with the nouns and accompanying adjectives removed, the remaining language is straightforward in the same way as extract 1:

Extract 2:

The **X** gets bigger, **X** by **X**; a **X X**, a **X X**, a **X X** of **X**, takes it inexorably towards its **X X**. The **X** has been functioning for only **X X**; but in those **X X** it has done **X**

This extract is taken from Malcolm Bradbury’s *The History Man*, and the omitted words are much easier to understand:

Extract 2: nouns with their accompanying adjectives

university

year

year

new building
new path
new stretch
water
fuller realization
place
ten years
ten years
everything

Extract 2: *The History Man* (p.67)

The university gets bigger, year by year; a new building, a new path, a new stretch of water, takes it inexorably towards its fuller realization. The place has been functioning for only ten years; but in those ten years it has done everything... .

The extracts illustrate why a key aspect of the materials development has been a focus on lexis, ensuring that terms are contextualized in some way, primarily through essays and dialogues, but sometimes through labelled diagrams.

CURRICULUM ISSUES

As we have noted above, Anthony stresses four pillars of ESP (needs analysis; materials and methods; learning objectives; evaluation). In this section, we consider how the syllabus we have developed fits into a broader curriculum, exploring the link between general English studies and English for specific purposes and within ESP, the opportunities for developing a broader curriculum.

General English and English for Specific Purposes

The course we have described was developed in a particular situation, at a national university which, at the time, had a two-year general English curriculum. Here, we consider how general English and English for Specific Purposes are related.

As we noted above, the grammar of ESP texts is covered by general English, so that developing general English skills is very much an aid to transitioning to ESP. Also, it is important to note that practitioners in specialized areas, such as doctors and engineers, within their lives engage in many practical everyday activities that would fall within the definition of general English such as travelling, dining, meeting, and greeting. Consequently, the study of general English is an important precursor to the learning of specialized English. In addition, in medicine, we have noted the need for two registers, one relating to the professional technical English used between doctors, and a simpler everyday English that is used between doctors and patients. The more general English that is learned prior to specialized English is important as a resource for doctors in giving simple explanations to patients. Without this general English, doctors would be left with only the technical words. For example, the following passage, written for patients, comes from the NHS webpage:

The mitral valve is a small flap in the heart that stops blood flowing the wrong way. Problems with it can affect how blood flows around the body... Mitral valve regurgitation is where some blood flows the wrong way in the heart because the mitral valve does not close properly. (<https://www.nhs.uk/conditions/mitral-valve-problems/>)

While it may be difficult for students and doctors in Japan to explain medical problems in English, requiring practice in these explanations, it is much easier for them to develop this skill if they have first developed a wide range of vocabulary and skills in general English, which they can then use to build their vocabulary and skills in ESP. For example, within the student materials of the project, the central nervous system unit contains the following passage:

A subarachnoid hemorrhage is bleeding in the space between two of the meninges: the arachnoid membrane and the pia mater. Some subarachnoid hemorrhages are due to the rupture of aneurysms. In other cases, they are caused by head trauma. A major symptom is a “thunderclap headache”—a sudden and very severe headache which is continuous. In non-trauma cases, this may happen after a bath or other household activity. There may be other symptoms such as vomiting, drowsiness and even blackouts (losses of consciousness). (p.21)

Within the passage, the underlined English is shared with general English, so that if a student has a good grounding in general English, she/he can focus on the specialized terms in bold.

Developing a Broader Curriculum within ESP

The research described here has to some extent focused on a transitional syllabus of 14 units, designed to offer students the opportunity to develop a core medical English vocabulary, and develop some basic skills and abilities in using medical English. Here, we consider what areas the research and materials development have not covered and how they might develop in the future.

Written EMP: From reference book to article

The current research has a very strong element of vocabulary-building in context, and this has been informed through the use of corpus analysis on *Gray's Anatomy for Students* and *Harrison's Principles of Internal Medicine*. However, as students progress in their studies, a focus on medical research articles becomes more important. These can take the form of case reports, case studies, clinical studies, and summary articles. Of these types of article, the case report, the writing up of a single unusual case, is perhaps the easiest to study. Research can be undertaken to examine the features of case reports, and to consider how materials could be developed to aid students in both reading and writing such reports in English. This could be further developed into an analysis of case studies where researchers use a set of cases to create hypotheses.

Spoken EMP: From role play to simulated patient

Our materials involve the use of illustrative dialogues and role plays to introduce the language of doctor-patient interaction. The use of history-taking role plays allows students to experiment with language,

particularly with asking questions to elicit information. However, it is very different to actual history taking. An intermediate step between the two would be to use simulated patients, who are not known well by the students, to create situations closer to the reality of actually dealing with patients. These situations could go beyond history-taking to explaining results of tests and recommending treatments. It is in these stages of doctor-patient interaction that a doctor may need to explain a patient's problem in simple English, deploying her/his broad language resources to be clear in communicating with the patient.

An Integrated Curriculum

Based on the suggestions above, an integrated curriculum would comprise three stages involving both general English and medical English (Table 1). Such a curriculum would the skills and language developed in general English to initially develop some basic skills and abilities in medical English, and finally to hone those basic medical skills into spoken and written medical discourse.

TABLE 1. Stages of an Integrated Curriculum

1	General English	
2	Basic Medical English	
3	Doctor-Patient Spoken Discourse	Doctor-Doctor Written Discourse

CONCLUSION

In this article, we have summarized six years of research on English for Medical Purposes, oriented towards developing materials and a word list that aid students in transitioning from general English to English for specific purposes in their chosen profession.

The single greatest challenge of the research has been to create a word list that is embedded within materials designed for communicative language teaching. This has been achieved through an interplay between discourse analysis and corpus analysis, as well as the input of key medical professionals within the medical school of Hiroshima University.

In reflecting on the research, two key aspects emerge. The first is that while initial planning acts as a starting point and structure for thought, this tends to be substantially different from what actually happens in the research process. Within six months of the start of the research, a linear process of corpus analysis leading to materials creation was abandoned in favour of the more fertile parallel approach. Similarly, with the initial planning for online materials, this project was switched to a flipped learning approach rather than creating a purely online course.

The second aspect reflects the need for integration. The success of the research has been due to finding ways of cooperating and sharing expertise both between medical professionals and applied linguists, as well as across groups such as the medical school and the Institute for Foreign Language Research and Education.

The immediate future direction of the research on EMP will be on researching the professional English that is used by practising doctors, and investigating how features of this discourse can be introduced to students who wish to take their medical English knowledge and skills closer to this level.

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APPENDIX: 14 UNITS OF MATERIAL

1. Anatomy Planes, Locations and Views
2. The Musculoskeletal System
3. The Brain
4. The Heart
5. The Lungs
6. The Endocrine System
7. The Gastrointestinal System
8. Liver
9. Integumentary System
10. Lymphatic System
11. Urinary System
12. Reproductive System
13. Eyes
14. Ears, Nose, Throat

ABSTRACT

Reflections on an EMP (English for Medical Purposes) Project

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In the first part of this article, we document and reflect on a six-year project to develop materials and a word list for undergraduates studying English for Medical Purposes (EMP) at a medical school in Japan. We describe the initial planning, early stage, mid-term innovation, and final stage of the project. We also recount how plans changed to reflect developing understandings of medicine and the need to consider both discourse and vocabulary together in order to create a word list embedded within the student materials. In addition, we note how plans for online materials were changed to create a flipped-learning course rather than a purely online course.

In the second part of the article, we discuss the relationship between general English and English for Medical Purposes, particularly with regard to vocabulary and grammar. We conclude by considering how further research on EMP could lead to a fully integrated English language curriculum for undergraduates.

要 約

医学に特化した英語教育（EMP）プロジェクトの総括

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本稿の前半では、日本の医学部生を対象とした「医学英語（English for Medical Purposes, EMP）」のための「語彙リストの作成」と「教材開発」に関する6年間のプロジェクトについてまとめる。具体的には、プロジェクト開始時の計画立案、初期及び中期における改良、そして完成期の取り組みについて概観する。その中では、どのように学部生の医学に関する理解度を反映させるために計画を修正したか、また、学生用の教材に組み入れるべき「語彙リスト」をどのように作成し、そして「学習素材」と「語彙」の融合を図る必要性があったかを詳述する。さらに、開発したオンライン教材を「反転授業」に活用できるように、どのように改発・改良したかについても報告する。

それに続き、教養教育英語授業と医学英語の「関係性」について、とりわけ語彙と文法という言語学的視点から吟味してみる。最後に、今後の医学英語教育に関する研究が、いかに学部生を対象とした英語教育カリキュラム全般の充実に資するかを述べてみたい。