

Analysing Medical English Materials Development at a University Using a Communicative Competence Model

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In this article, we examine the development of medical English materials, using an adapted communicative competence framework, built from Celce-Murcia, Dornyei and Thurrell's (1995) five-competence model. Two new competences have been added: critical competence and field competence. In a previous article (Davies, 2015), discourse competence, critical competence, and field competence were considered to be overarching competences that contained within them strategic competence, actional competence, sociocultural competence, and linguistic competence. In the current article the main focus is on analyzing materials from the perspective of field competence, discourse competence, and linguistic competence.

This article forms part of a project to develop teaching materials, word lists, and corpora for students on a medical course at a national university, which has been documented in a previous article (Fraser, Davies & Tatsukawa, 2015). It is a case study, in which conceptual ideas have developed in the process of planning, designing, and teaching a course to third-year medical students. We analyse medical English materials created specifically for students on the course. These materials have been described in some detail in previous articles, and key examples are provided in the appendix of this paper for reference.

LITERATURE REVIEW

The model used in this analysis is represented below (Figure 1). The arguments for it have been made in a previous paper (Davies, 2015). The model differs conceptually from the Celce-Murcia, Dornyei and Thurrell (1995) framework in that it does not aim to create discrete categories. Instead, the categories can be seen as sets of lenses for analyzing language use, with a view to building teaching materials. The model is specifically designed for universities, and is illustrated by the following hypothetical situation: Outside universities, English language teachers may be required to teach language in fields that by university standards are inappropriate; for example, if a fortune-teller wishes to learn English for the purposes of his/her work, then an English teacher may have to focus on the field of fortune-telling, but that field would not fit with the critical thought processes required at university.

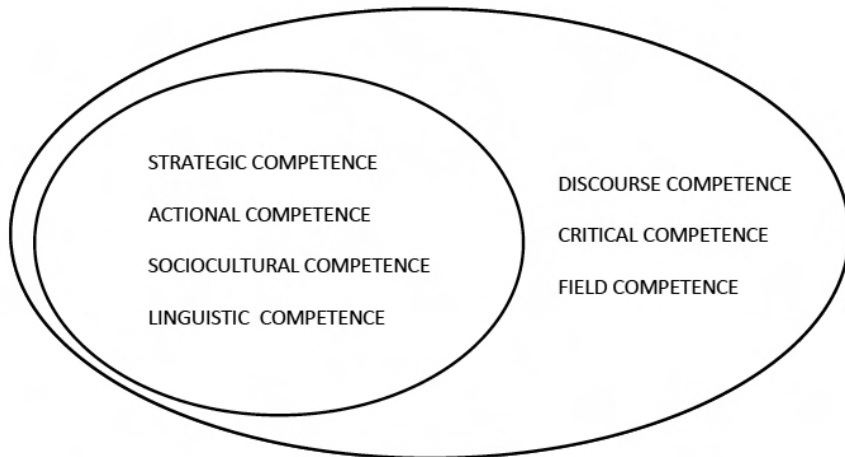


FIGURE 1. Communicative Competence Model for Universities

What is communicative competence? As Widdowson (2003) has noted, the term appears in the literature a number of times, and the connections between concepts that underpin the label vary considerably. In linguistics, the term “competence” is associated with Chomsky (1965), who makes the distinction between competence and performance. Hymes (1972) introduces the concept of communicative competence. This term is used by Canale and Swain (1980), Canale (1983), Celce-Murcia, Dornyei and Thurrell (1995), Bachman (1990), and Bachman and Palmer (1996). Widdowson notes that there is little connection between Hymes’ description of communicative competence and the later writers.

Given the variation in the definition of communicative competence, what is meant by the term in this article? The Canale and Swain, Canale, and Celce-Murcia, Dornyei and Thurrell models clearly do have strong family resemblances, and the model proposed in Davies (2015) is linked to this set of three. In the current article, competence equates to ability, so that we could talk of discourse ability and critical ability rather than discourse competence and communicative competence. However, for the sake of clarity and consistency, the term “competence” will be used. For example, *linguistic competence* is generally recognized as a technical term, while *linguistic ability* is much more open to interpretation, and consequently risks much greater misunderstanding on the part of readers.

A further point to note is the relationship between field competence and critical competence. As argued previously (Davies, 2015), it is necessary to accept overlaps between the competences. The diagram above (Fig. 1) reflects the overarching competences (discourse, field, critical), which contain the remaining competences (linguistic, sociocultural, strategic, actional). Field competence and critical competence are new additions to the Celce-Murcia, Dornyei and Thurrell (1995) terms. Field competence concerns abilities within a particular field such as medicine, and critical competence is defined as abilities common to all fields within a university. Given that this article is focused on medicine, the relevant critical competence is a subset of field competence, and the two are considered together in the subsequent analysis, effectively reducing the model to six competences for this paper.

A key issue for this article concerns abilities in a first language (L1) and a second language (L2). This

can be illustrated as follows: Medical students in Japan study medicine through the medium of Japanese (for most students, their L1), and there is no medical English component in their national professional examinations; consequently, it is possible to become a doctor with a minimum of English language (L2) ability, so that there may be many doctors with a very high level of field competence, but a low level of discourse competence in English. This complicates the model because field competence in medicine can be independent of communicative competence in English. A related issue for English teachers is the relationship between field competence and discourse competence in English. Most English teachers have only a layperson's knowledge of medicine but a very high level of general discourse competence in English.

Regarding the issue above, it is necessary to invoke a principle of sufficiency. In terms of drawing on the field competence of medical professors in Japan, it has been necessary to work with those that have sufficient discourse competence in English, and to teach medical English it is necessary to have sufficient field competence to do it effectively. The sufficient field competence of an English teacher is, in most cases, considerably lower than the sufficient field competence of a doctor or a medical student. However, the primary purpose of the English teacher is not to teach medicine through English but to teach medical English that connects with the students' existing field competence. This to some extent reflects Widdowson's (1978) ideas:

In a science textbook, for example, we find formulae and conventional diagrams which pupils have to interpret in their reading and writing as a part of their learning of science. To this extent, pupils have acquired or are acquiring communicative abilities already. What still has to be done is to associate these communicative abilities, previously related to linguistic skills operating on their own language, to the linguistic skills related to the foreign language. (p. 74)

We argue that medicine has a very strong visual base to it, being connected to the human body in all its physicality. Anatomy, for example, is replete with maps of the human body. Many students refer to an atlas: Netter's (2014) *Atlas of Human Anatomy*. Within medicine, these maps of the human body convey meaning in a way that is more universal than the words of a particular language. Consequently, in addition to descriptions in English and Japanese translations, there are opportunities for students to connect their English to their field competence through diagrams, maps, and formulae.

METHOD

In this article, we consider medical materials through the prism of the communicative competence model. In discussing the competences, the issue of teacher mediation must be addressed. As Widdowson (1990) has noted in relation to syllabuses, they are abstract specifications. A similar argument can be made with materials. Whether they are actually utilized in the way they were intended by the materials designers depends on the mediating activities of the teachers using them in class. However, as materials designers, we can illustrate how the materials have been designed for use within the communicative approach, and so in the discussion we describe how they have been designed to this end, not how they are actualized in practice. The following questions are addressed:

How have the materials been designed in relation to the following competences?

- field/critical competence
- discourse competence
- linguistic competence

In the discussion section, we consider a further question:

- What are some key issues that emerge in using a competence model as a framework of analysis for materials development?

In answering these questions, we examine some of the materials used in the third-year course, and consider the research that went into the creation of such units.

COMPETENCES AND MATERIALS DEVELOPMENT

In this section we mainly consider three competences: field/critical competence, discourse competence, and linguistic competence. These are the competences that have been most directly addressed in materials creation. Regarding the remaining three competences (strategic, actional, sociocultural), while the materials have not been designed to address these overtly, the tasks provided in the materials are set up so that students can use such competences. For example, sociolinguistic competence is primarily addressed through the range of discourse types, such as doctor-patient dialogues, in contrast to the more technical language of doctor-doctor communication. Although the materials do not specifically encourage students to compare and contrast the language from a sociocultural perspective, appropriate language is illustrated through examples.

Also, as noted in a previous article (Davies, 2015), there are strong similarities between actional competence and strategic competence. In many ways strategic competence is a type of actional competence to remedy small breakdowns in communication, and might better be described as tactical competence. While there is not an overt focus on strategic competence, the creation of role-playing tasks to identify medical conditions and diseases offers students the opportunity to use some very basic strategic competence, using utterances such as “Could you repeat that?” in conjunction with actional competence, such as asking for more information about a problem, noting down symptoms, and identifying diseases.

Field/critical Competence

As noted in the literature review, the aim of the materials is primarily to connect the content of the EMP (English for medical purposes) materials with the existing medical knowledge of the students. In general, the students themselves already have sufficient field competence for the stage they have reached in their studies. For the materials design, the importance lies in the accuracy of the content. The primary source for developing this accuracy has been doctors themselves. Such field knowledge has also been supplemented by medical students in more informal exchanges. This has been documented in a prior article (Davies, Fraser, & Tatsukawa, 2014). Other sources have been reference texts, websites, and published EMP materials.

Medical doctors

One of the most important parts of the process for materials development has been contact with senior professors within the medical faculty through interviews and by email (Davies, Fraser & Tatsukawa, 2014).

It was through this process that professors could broadly outline the stages in development of medical students and emphasize key areas of study. They laid stress on anatomy as the basic field of study on which medicine is built, and suggested that students should study “basic” medical conditions, which we interpreted as common and/or well-known medical problems. In terms of materials construction, we followed this advice, creating an anatomy section (see appendix) that built into a longer section focused on medical problems.

While general ideas were given by senior medical professors, another source of field knowledge came from a non-university doctor. The teaching of evening classes at a non-university hospital provided regular contact with medical doctors and nurses. Weekly contact with a neurosurgeon was important in terms of materials development. He was prepared to spend time after class talking about medical problems treated in his field, and was asked to describe four conditions in the field neurosurgery that had slightly different symptoms from each other. On the basis of his advice, we researched the four problems in much greater depth.

Another key issue for creating the materials was getting them checked by doctors to make sure that they were accurate enough. After we produced a trial unit of material, we passed it to the neurosurgeon, who identified a number of mistakes and misleading definitions. For example, in the material we originally used the term *arachnoid* rather than *arachnoid membrane*. Later in the same unit, an *aneurysm* had been defined as “a lump” in the wall of a blood vessel, but the neurosurgeon was concerned that “lump” had too strong an association with tumours, so it was changed to a *balloon-like bulge*. He also noted that a particular anatomy diagram was potentially misleading and was difficult to label. Consequently, we were able to make the unit clearer and more accurate.

Following on from the trial unit, we produced some question sheets for specialists, asking them to choose four medical problems in their fields of expertise with similar but slightly different symptoms. The neurosurgeon approached several colleagues, and from the completed sheets and further research we were able to build more units of material.

In relation to corpus analysis, two neurosurgeons were able to help us by identifying some of the key neurosurgery journals and supplying us with nine articles as PDFs from those journals, which we were then able to convert to text files for corpus analysis using Laurence Anthony’s (2014) *AntFileConverter*.

Medical reference texts

A further source of field knowledge was through the texts that medical professors and students recommended. As corpus analysis was a component of our project, a key issue was what texts to choose. In their interviews, senior medical professors referred to a variety of books and journals. Given their emphasis on anatomy and general medical problems, two books were chosen: *Gray’s Anatomy for Students* and *Harrison’s Principles of Internal Medicine*. Also, a senior professor suggested *The Washington Manual of Medical Therapeutics*. Informal discussions with students helped add to the sources of material. A second-year student explained the importance of having Netter’s (2014) *Atlas of Anatomy* as a detailed reference text for anatomy.

Internet sources

Another important source of field knowledge was via a variety of websites, particularly those oriented towards a general public. While experienced medical doctors were able to provide guidance and concise explanations, it was necessary to follow this up with background research. Sites visited varied from *Wikipedia* (<https://en.wikipedia.org/>) to *NHS Choices* (<http://www.nhs.uk/Conditions/>) and *Webmd* (<http://www.webmd.com>).

English language teaching texts

A wide variety of EMP materials have been published, and books by major publishers were examined for content, examples being textbooks by Glendinning and Holstrom (2005), McCarter (2010), and Chabner (2012).

Discourse Competence

Discourse competence has been approached from the perspective of both written and spoken discourse, and developed on the basis of an analysis of doctors' ideas and suggestions. The initial starting point of the materials was the selection of key medical problems. These were used to create discourse in the form of essays and idealised dialogues. In creating the essays, we used the Widdowson's (1978) concept of the simple account. As he notes, "it is a recasting of information abstracted from some source or other to suit a particular kind of reader" (p. 89). Each section has one essay on anatomy (see appendix), and one on medical problems. Following the essay on medical problems, tasks are created to extract symptoms from the essay, which build into a final section on doctor-patient dialogues. Based on the essays and dialogues, various linguistic and interactional tasks have been developed. For example, through role-plays students are expected to use their communicative competence to note down symptoms and match fictional patients to pre-specified medical problems.

Linguistic Competence

In this project, the primary focus for linguistic competence has been on vocabulary building, with a view to developing a key word list. This has been achieved through an increasing understanding of the medical field to create simple accounts, and through corpus analysis.

There are two vocabulary tasks within each unit (see appendix). This vocabulary was, for the most part, identified from the essays themselves. In relation to the anatomy section, the task involves matching anatomy terms to diagrams; in the medical problem section, the task involves matching medical terms to written definitions in English. In addition, a medical word list was constructed using corpus software on the materials (Fraser et al., 2015). In this way, most of the medical terms are embedded in texts and often occur in more than one section. However, what should also be noted is the reciprocal effect that a focus on linguistic competence has on discourse. Corpus analysis of the two medical texts (*Gray's Anatomy for Students* and *Harrison's Principles of Internal Medicine*) has allowed us to compare the words in the materials with frequency counts from the two corpora. This has helped us to identify what might be considered "gaps" in the materials. As our aim is to teach a high-value core of medical language on which students can build, this linguistic focus will influence discourse content in future materials. Consequently,

the relationship between the holistic focus on discourse and the more piecemeal linguistic focus is reciprocal.

DISCUSSION

Several issues emerge from the analysis of the materials and their construction, using the competence model as a framework. These include the relationship between knowledge and competence in EMP, the relationship between field competence and discourse competence in creating communicative competence in EMP, and the relative importance of the different competences for third-year medical students.

The Relationship Between Knowledge and Competence

In this article we have referred to both *field competence* and *field knowledge*. This has been necessary because to make materials we have drawn in a very minor way on the current collective expertise of a profession. We define this as field knowledge, and it can be illustrated in relation to examples in our background research. For example, many of the doctors we contacted are specialists. If we asked a detailed question about something that lay outside their area of expertise, they would contact the relevant specialist and provide an answer. Similarly, they gave us recommendations for highly valued reference books within the medical profession. We argue that field knowledge as we define it here is the broad framework of reference for teaching EMP. In contrast, competence varies across individuals and groups. For example, field competence of third-year students differs from that of qualified doctors.

The Relationship Between Field Competence and Discourse Competence

As noted in the literature review, field competence can be independent of discourse competence in English. For example, the EMP instructors in this project are in a position where their field competence in medicine is considerably below that of their students. An implication for this is that materials have to be very carefully constructed with medical practitioners' help and advice. Instructors are also likely to find it difficult to move away from the content of the materials as their field competence is limited; while it is possible for an experienced instructor to elicit a few explanations from students, such exchanges are likely to be quite restricted. However, given the challenges in terms of linguistic competence, having activities which allow students to try explaining anatomy and medical conditions on the basis of having read simple accounts of them may be appropriate for their level of study. The aim of the course is to build communicative competence in core medical language. Developing more extensive discussion-based activities that involves such language may occur later in the students' studies.

Are Some Competences Emphasised More Than Others?

In this article we have focused mainly on three competences, and this, *prima facie*, shows that the materials have a stronger emphasis on these competences than the others. As noted above, this may be due to the type of study that students undertake. At this level of their medical education, students are primarily classroom-based, and a focus on sociocultural, actional, and strategic competence has limitations, especially in a situation where almost all the students are Japanese, and so can code-switch into Japanese. However, the materials do have minor discussion tasks and role-plays which students can use to work on actional, strategic, and sociocultural competence. Also, given that students are at an intermediate level of English, it

is assumed that they have sufficient strategic competence to address problems in communication. From the perspective of role-plays the greatest weakness may be in developing sociocultural competence. Although the materials are designed to address both written and spoken medical English, a key future area for students is doctor-patient consultations in English. Pair-work role-plays in class are very rudimentary in this respect. However, as students gain experience in L1 simulated medical consultations after their third-year studies, the role-plays in the materials can be used to give students some basic spoken discourse skills on which they can build in the future.

CONCLUSION

This analysis of EMP teaching materials on the basis of a communicative competence model has both helped clarify some of the concepts in the model and the design of the EMP teaching materials.

A key issue is the relationship between discourse competence and field competence; for EMP teacher and student alike the development of communicative competence in EMP requires both the development of field competence in L1 or L2 and discourse competence in the L2. It is the combination of these two competences that leads to the development of communicative competence in EMP. In a similar way, for general English, discourse competence in conjunction with a broader concept such as “situational competence” leads to the development of communicative competence.

An analysis of the materials using the model indicates that the main emphasis of the materials is on discourse and its linguistic component. Given that the materials are designed for a third-year medical English course, this may be appropriate; the building up of vocabulary in context may need to precede activities which require a much stronger emphasis on productive skills. The development of simulations for doctor-patient consultations is beyond the scope of the third-year course, but research into this area would be valuable in considering the development of the sociocultural, actional, and strategic aspects of communicative competence in EMP.

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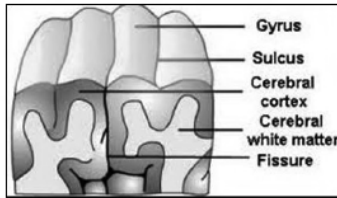
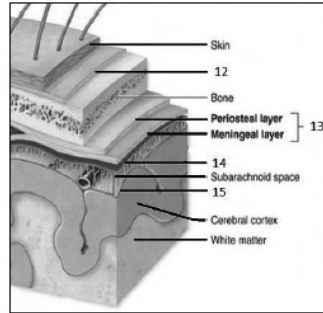
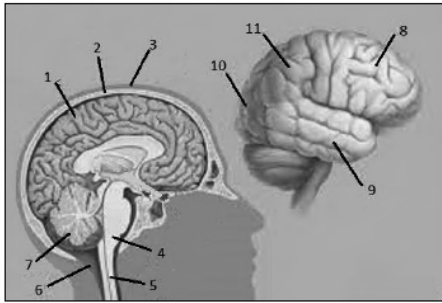
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Appendix: Extracts From Teaching Material

The Brain

Anatomy



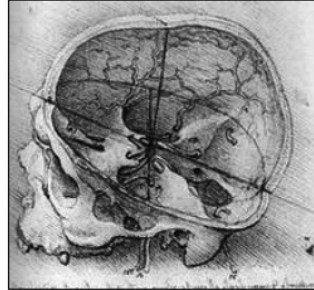
frontal lobe brain stem pia mater temporal lobe cerebrum
 skin periosteum spinal cord cranium parietal lobe cerebellum
 dura mater occipital lobe cisterna magna arachnoid membrane

Write the terms in the box next to the correct number from the diagrams.

word	word
1.	9.
2.	10.
3.	11.
4.	12.
5.	13.
6.	14.
7.	15.
8.	

Anatomy of the Brain

The adult human brain weighs about 1.5 kg and sits within the cranial cavity. It is composed of neurons, glial cells and blood vessels. It contains about 200 billion neurons with 125 trillion synapses. Being one of the vital organs of the body, it is protected by layers of bone and tissue. The hardest protective layer is the cranium, which is a set of fused bones. This is covered by the periosteum—a layer of connective tissue—and the skin.



Beneath the cranium there are three layers of tissue, called the meninges. The tough fibrous outer layer is the dura mater. It is fused to the skull at various points, and so anchors the brain. Below this is the arachnoid (spider-like) membrane, which is laced with blood vessels and attached to the dura mater. The last of the meninges is the pia mater which is a delicate sheet of tissue that is full of capillaries. The space between the arachnoid membrane and the pia mater is called the subarachnoid space. It is filled with cerebrospinal fluid, which acts as a cushion and helps to protect the brain.

While similar to other mammalian brains, the human brain differs in the relative size of its cerebral cortex, which is much larger than in other mammals. The cerebral cortex is a large sheet of neural tissue that is folded, creating ridges (gyri) and grooves (sulci), so that it fits within the cranial cavity. Due to its size, doctors describe the cerebral cortex using four areas: the frontal lobe, the parietal lobe, the temporal lobe and the occipital lobe. These are named after the bones of the skull under which the areas are located.

Questions

1. Which sheet of connective tissue covers the cranium?

2. What are the names of the three meninges?

3. What is the subarachnoid space?

4. With what is the subarachnoid space filled?

5. What are the ridges and grooves of the cerebral cortex called?

Speaking

Work with a partner and do the following activities. Use words from the boxes to help you.

Student A

Talk to student B. Describe the layers of tissue and bone that protect the brain.

periosteum membrane cranium fused meninges dura fluid
arachnoid pia space mater cerebrospinal cushion tissue

Student B

Talk to student A. Describe the cerebral cortex.

tissue gyri neural parietal sulci temporal occipital frontal
ridges grooves sheet lobe

Preparation for Neurosurgery Section

Discuss the following questions. Make notes.

Notes

- 1.) Would you like to be a neurosurgeon? Why/why not?
- 2.) What diseases of the brain have you studied?
- 3.) What should you do to keep your brain active?
- 4.) What is the most interesting thing about the brain?
- 5.) How is the brain affected by food and drink?
- 6.) What effect does lack of sleep have on the brain?
- 7.) What instruments can you use to check a patient's brain?
What are their advantages and disadvantages?

Study skills

- 8.) What do you do to learn new medical words?
- 9.) What books do you like to use when you study medical English?
- 10.) What Internet sites do you like to use for medical English?

Pair Work: Role Play - Student A

Work with a partner and do the following role plays.

1. You are the patient.

John Smith (35, single, teacher) Starting line: "I have a bad headache."
 You have a bad headache. You've had the headache for about a week. It's been getting worse and worse. It's really bad when you get up in the morning. Your left arm and left leg are feeling very weak.

2. You are the doctor. Make notes.

SURNAME	Williams	FIRST NAMES	Jane
AGE	54	SEX	F
		MARITAL STATUS	M
OCCUPATION	Housewife		
PRESENT COMPLAINT			

3 You are the patient.

Anne Jones (24, single, librarian)

Starting line: "I have a bad headache." You have a bad headache. You've had the headache since yesterday. It's very painful. It came on suddenly when you stood up after breakfast, and it's there all the time. You threw up (vomited) this morning. You feel drowsy.

4. You are the doctor. Make notes.

SURNAME:	Baker	FIRST NAME(S):	David	AGE:	87	SEX:	M
MARITAL STATUS:	M	OCCUPATION:	Retired builder				
PRESENT COMPLAINT							

Each patient has one of the following medical conditions. Match the patients with the conditions.

Diagnosis	Patient number
Subarachnoid hemorrhage	_____
Chronic subdural hematoma	_____
Cerebral infarction	_____
Brain tumor	_____

Pair Work: Role Play - Student B

Work with a partner and do the following role plays.

1. *You are the doctor. Make notes.*

SURNAME: Smith	FIRST NAMES: John	AGE: 35	SEX: M
MARITAL STATUS: S	OCCUPATION: Teacher		
PRESENT COMPLAINT			

2. *You are a patient.*

Jane Williams (54, married, housewife) Starting line: “There’s something wrong with my body.” You fainted this morning, and your right side feels very weak – You had difficulty lifting the kettle and now you seem to be limping. You don’t have a headache but you feel very drowsy. You have had high blood pressure for the last two years.

3. *You are the doctor. Make notes.*

SURNAME: Jones	FIRST NAMES: Anne	AGE: 24	SEX: F
MARITAL STATUS: S	OCCUPATION: Librarian		
PRESENT COMPLAINT			

4. *You are a patient.*

David Baker (87, married, retired builder) Starting line: “I have a bad headache.” You have a bad headache, and it has become difficult to walk. Your right arm and leg feel quite weak. You had a fall five weeks ago and hit your head and shoulder on the ground. You’re worried about your memory – You can’t even remember your wife’s birthday.

Each patient has one of the following medical conditions. Match the patients with the conditions.

Diagnosis	Patient number
Subarachnoid hemorrhage	_____
Chronic subdural hematoma	_____
Cerebral infarction	_____
Brain tumor	_____

ABSTRACT

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This article forms part of a project to develop teaching materials, word lists, and corpora for students on a medical course at a national university, which has been documented in a previous article (Fraser, Davies & Tatsukawa, 2015). It is a case study, in which conceptual ideas have developed in the process of planning, designing, and teaching a course to third-year medical students. We analyse medical English materials created specifically for students on the course.

In reflecting on the creation of teaching materials, a key issue is the relationship between field competence, in this case medical competence, and discourse competence in English. We consider how we have drawn on field knowledge through interaction with doctors and the use of reliable written medical sources, such as reference books and webpages. We also examine our approach to discourse, competence with reference to Widdowson's (1978) simple accounts, and linguistic competence in the form of vocabulary tasks. Finally, we consider whether actional, strategic and sociocultural competence are sufficiently addressed in the design of the materials; we argue that the materials only address these in a minor way because students are essentially classroom-based in the early years of their studies, and that the need to address these competences more fully will occur in later courses and course materials.

要 約

コミュニケーション能力仮説に基づいた大学医学英語教材開発の分析

デイビス・ウォルター

フレイザー・サイモン

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小論では Celce-Murcia, Dornyei and Thurrell's (1995) の 5 つのコミュニケーション能力仮説を援用した医学英語教材の開発を議論することとする。その際、この 5 つに新たに「批判的能力 (critical competence)」と「専門分野能力 (field competence)」を加えることとした。本論は医学目的の英語 (EMP) に焦点を当てるので、批判的能力は専門分野能力の一部として捉えることとした。Davies (2015) では、「談話能力 (discourse competence)」と専門分野能力は、これらの二つの能力に内在する「方略的能力 (strategic competence)」「語用論能力 (actional competence)」「社会言語的能力 (sociocultural competence)」「言語学的能力 (linguistic competence)」を統合するものと考えられた。

本論は、国立大学での医学生を対象とした語彙リスト、コーパス、教授教材開発プロジェクトの一部であり、プロジェクトの概要については Fraser, Davies & Tatsukawa (2015) で既に報告済みである。小論は医学部 3 年生を対象としたコースの計画・立案・教授の過程で築き上げた概念的思考をまとめようとするケース・スタディである。具体的には、本コースのために特別に開発した医学英語教材を分析する。

教材開発の過程を振り返ってみると、専門分野能力（この場合は医学的知見）と談話能力との関係性を考えることが重要であった。医療職業人との情報・意見交換を通しての専門分野能力や参考書やウェブページ・サイト情報を拠り所としたことは言うまでもない。また、Widdowson (1978) の平易な説明を参考にして談話能力への吟味を分析し、言語学的能力は語彙タスクを用いて分析した。最後に、教材の立案に際して、語用論的能力や社会言語学的知見が十分に盛り込まれているかを検討した。学生は初期の専門教育においてはそのほとんどが教室内でなされているので、教材ではほんの少ししかこれらの 2 つの能力が育まれない。また、これらの能力の十分な伸長はその後の教材や授業（課程）で育まれる必要がある。