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研究課題名(和文) Toward minimizing L1 interference in Japanese healthcare professionals

研究課題名(英文) Toward minimizing L1 interference in Japanese healthcare professionals

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研究成果の概要(和文)：安全で効果的な医療提供には、エラーのないコミュニケーションが不可欠である。この研究では、日本人医療従事者が母語からの干渉を最小限に抑え、それによって医学用語をわかりやすく発音する能力を向上させるのに役立つ発音練習ガイドを開発した。ガイドは英語単語の英語発音を日本語発音と比較することにより、了解度を習得するように学習者をトレーニングします。100人以上の日本人健康科学専攻生で実施されたガイドのテストトライアルの結果は、ガイドを使用し毎週練習した15週間の学期の終わりに学生の英語発音頻度の著しい増加を示した。ガイドは、日本人医療従事者におけるL1干渉を最小限に抑えるために有望なアプローチである。

研究成果の学術的意義や社会的意義

As Japanese universities continue to introduce medical English in their health sciences curricula, the guides developed in this research offer a practical approach to raise health professionals who can speak English accurately, and thereby are better prepared for their role in a globalized society.

研究成果の概要(英文)：Error-free communication is indispensable for safe and effective healthcare delivery. In this project, two pronunciation practice guides were developed that can help Japanese students in medicine and allied disciplines minimize interference from their mother tongue and thereby improve their ability to pronounce medical terms intelligibly. The developed guides, named medical pronunciation practice guide-1 (MPPG1) and medical pronunciation practice guide-2 (MPPG2), train the learners to acquire intelligibility by comparing the English-way-of-pronunciation (EWP) of English words with their Japanese-way-of-pronunciation (JWP). The results of test trials of the guides conducted on more than 100 Japanese health sciences majors demonstrated a remarkable increase in EWP frequency in the students at the end of a 15-week semester during which they did weekly practice using each guide. The results offer a promising approach toward minimizing L1 interference in Japanese healthcare professionals.

研究分野：Foreign language education

キーワード：mother tongue L1 interference pronunciation healthcare professionals communication intelligibility safety

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1. 研究開始当初の背景

Error-free communication is indispensable for safe and effective healthcare delivery. Therefore, acquiring an intelligible English pronunciation is crucial for Japanese students enrolled in health sciences programs. However, teaching of pronunciation is not a common practice in Japanese high schools where English is taught for six years (reviewed in¹⁾). On the contrary, many Japanese high school English teachers, textbooks and dictionaries use katakana for reading and writing English pronunciation¹⁾. Consequently, most Japanese high school graduates are unaware of the fundamental differences between katakana and English pronunciation. They speak the so-called katakana English believing that they are speaking English and have difficulty being understood by non-Japanese speakers¹⁻³⁾.

Difficulties in English pronunciation encountered by Japanese high school graduates become more critical when they enter university and need to learn English related to their future profession and workplace. Particularly for students enrolled in medicine and allied faculties, acquiring an intelligible English pronunciation becomes crucial since communication can be a matter of life and death in healthcare. Thus, the need for pedagogical tools that can help Japanese students aiming for careers in healthcare disciplines acquire an intelligible pronunciation of English lexicon and the medical terms cannot be overemphasized.

Most pronunciation problems encountered by Japanese learners of English are attributed to L1 interference^{2,5,6)}. A large part of this interference originates in the katakana portion of the Japanese language, the syllabic part of the Japanese writing system used largely for writing foreign words. Using katakana, any foreign language word can be transformed into Japanese language losing in the process the pronunciation of its original language and instead acquiring a uniquely Japanese way of pronunciation. With English being a foreign language for native Japanese speakers, virtually the entire English lexicon can be written and pronounced in a Japanese way. As a result, when Japanese speak English, they experience L1 interference which often makes their speech incomprehensible to non-Japanese English speakers^{2,5,6)}.

While considerable literature exists on how L1 may interfere with L2 acquisition at various levels in Japanese EFL learners (reviewed in⁴⁾), little information is available on how the interference may be dealt with in the classroom, especially in the oral performance of L2. Smith³⁾ describes teaching the English pronunciations of katakana words at the beginning of each class whereas Wells⁶⁾ suggests the use of minimal-pair drills where the confusing sounds are compared and contrasted. However, besides the previous work in this area by the author⁴⁾, there had been no data on the systematic use or effectiveness of these or any other approaches aimed at dealing with L1 interference in the Japanese learners of English. The conventional approaches to teaching pronunciation are not effective in the Japanese context since they do not address the specific katakana-based L1 interference. The proposed research, thus, was undertaken to contribute toward filling the gap in this critical area, particularly in reference to the healthcare context.

2. 研究の目的

(1) Overarching objective

The overarching objective of this research was to develop a set of tools in the form of pronunciation learning and practicing guides to help Japanese students in medicine and allied disciplines minimize interference from their mother tongue and thereby improve their ability to pronounce commonly used and advanced medical terms intelligibly.

(2) Specific objectives

The project aimed to develop two pronunciation learning and practicing guides to help Japanese learners of health sciences improve their English pronunciation in the context of their future workplace. Toward this goal, the following specific objectives of the project were outlined:

1. Two pronunciation learning and practicing guides (level 1 and level 2) will be developed.
2. The level 1 guide will be based on common medical terms while the level 2 guide will use more advanced medical terminology.
3. The guides will be targeted toward students enrolled in Japanese health sciences programs.
4. The guides will aim to enable the students to learn and acquire intelligible English pronunciation in relation to discourse and settings in the context of healthcare.
5. Efficacy of the guides will be tested in Japanese university freshmen and sophomores enrolled in basic and advanced medical English courses at the applicant's institution.

2. 研究の方法

(1) Research plan

The research was planned to be undertaken in three phases. In the first phase, a basic or level 1 guide was to be developed based on theoretical and practical considerations combined with findings of previous research on the subject. In the second phase, the level 1 guide was to be assessed for its short-term (one-semester) and long term (two-semester) use in Japanese freshmen enrolled in medical English courses at the applicant's institution and based on those results, a

level 2 guide was to be developed. In the third phase, the level 2 guide was to be tested for its short and long-term uses in Japanese sophomores taking upper level medical English courses at the applicant's institution. Finally, the data for the test trials of both guides were to be compared, analyzed and documented for publication.

(2) Development of the guides

Main features and layout

The partial views of the level 1 guide named medical pronunciation practice guide-1 (MPPG1) and level 2 guide named medical pronunciation practice guide-2 (MPPG2) are shown in Tables 1 and 2, respectively. While the two guides have different word content, their basic features are similar. Thus, each guide is comprised of eight columns titled C1-C8. The columns represent eight sets of English words that can be pronounced in both English way of pronunciation (EWP) and Japanese way of pronunciation (JWP) and that commonly show L1 interference in Japanese learners of English. The letters (*a, au, o, r, r/l, s/sh, th, v*) below the column titles (C1-C8), indicate the primary focal points of interference in the words of the respective sets. The partial views of the guides contain only 2 words in each column merely to serve as examples for the purpose of this report. Each actual guide contains 14 words in every set making it a 14x8 matrix with 14 lines and 8 columns.

The number 14 for the lines in each guide was chosen simply to correspond to the 15 weeks of lessons in a typical one-semester university class at most colleges and universities in Japan. The objective in doing so was to have the students work on at least one line per week, after introducing the guide in the first week. In practice, however, the guides of this type can contain any number of lines and any number of lines or columns may be used for study and practice in a given lesson.

With respect to the word content, the MPPG1 is comprised of commonly used medical terms while MPPG2 contains more advanced medical terminology. The words used in the guides were selected from, but not limited to, authentic medical textbooks such as *Delmar's Case Study Series: Medical-Surgical Nursing* (Thompson, 2008) and medical dictionaries such as *Dorland's Illustrated Medical Dictionary* (32nd Edition, Elsevier, 2012).

Table 1. A partial view of the medical pronunciation practice guide-1 (MPPG1)

C1	C2	C3	C4	C5	C6	C7	C8
<i>a</i>	<i>au</i>	<i>o</i>	<i>r</i>	<i>r/l</i>	<i>s/sh</i>	<i>th</i>	<i>v</i>
1. allergy	1. aura	1. doctor	1. nurse	1. bladder	1. sick	1. health	1. fever
2. antibiotic	2. aural	2. body	2. nursing	2. clinic	2. symptom	2. healthy	2. liver

Table 2. A partial view of the medical pronunciation practice guide-2 (MPPG2)

C1	C2	C3	C4	C5	C6	C7	C8
<i>a</i>	<i>au</i>	<i>o</i>	<i>r</i>	<i>r/l</i>	<i>s/sh</i>	<i>th</i>	<i>v</i>
1. adenoma	1. audiometer	1. bronchus	1. cistern	1. pleural	1. silicosis	1. arthritis	1. valvular
2. abscess	2. auriclectomy	2. cholera	2. circumference	2. placental	2. singultation	2. chemotherapy	2. varix

Instructions for using the guides

Based on the author's previous research in the field and observations made during the current research, it was realized that for effectiveness of the guides it was critical for the learners to fully comprehend their underlying principle and rationale. Hence, an easy to understand explanation of the guides' fundamental methodology and instructions for their use were prepared for the students in both English and Japanese. The instructions for the use by the teachers were prepared as described previously⁴.

(3) Testing of the guides

In the second and third phases, MPPG1 and MPPG2 were introduced to the freshmen and sophomore classes, respectively, with clear instructions for their use prepared as described above. For example, at the start, an average Japanese student pronounced the eight words in row 1 of MPPG1 as: *arerugi, oora, dokuta, naasu, buradda, shikku, herusu and feeba*, respectively. Students were then explained how to distinguish between EWP and JWP of each word and shown how to practice to acquire the latter.

The guides were then used to practice pronunciation each week in addition to a regular lesson involving other reading,

writing, listening, and speaking activities. The time spent on pronunciation practice using the guides ranged from 10-15 minutes per class with additional practice assigned as a homework task.

The number of freshmen on whom the MPPG1 was tested was 87 in the first and second semesters whereas the number of sophomores on whom the MPPG2 was tested was 11 in the first semester and 4 in the second semester. The smaller numbers for sophomores were due to the fact that unlike the freshmen medical courses which, at the author's institution, are required subjects, the courses offered to the sophomores are elective with a much smaller enrollment.

For testing both guides before and after using them for one semester, each student was asked to read aloud all eight words in a given row of the guide. Students read the words individually, only before the author, in a quiet setting and data were recorded manually as EWP or JWP depending on whether the student pronounced the words in an English way or Japanese way, respectively. In recording the data, JWP was taken as the reference point and any other way of pronunciation distinct from it was considered as EWP as previously described⁴⁾. The testing protocol together with the entire research project were approved by the ethics committee of the author's institution.

(4) Data analysis

In each trial, for each student, the recorded data included one value before and one after the practice period, for each of the eight columns of the guide. The values were represented as percent frequencies of EWP for each column as well as means of all eight columns, before and after the use of the guide. Differences in before and after frequencies were analyzed by chi-square test using CHISQ.TEST function of Microsoft's Excel software (2019 version for Windows). For graphic representation of the data, CHART TOOLS function of the same software was employed.

4 . 研究成果 Results

Figure 1 shows the percent frequencies of EWP in 87 Japanese university health sciences freshmen before and after the use of MPPG1 for one semester. There was a highly significant increase in the frequency of EWP for each column and in the mean of all eight columns ($p < 0.00001$). The increase was the greatest for C3 where only 11% (10/87) of the students could pronounce the words correctly before using the MPPG1 as compared to 95% (83/87) after.

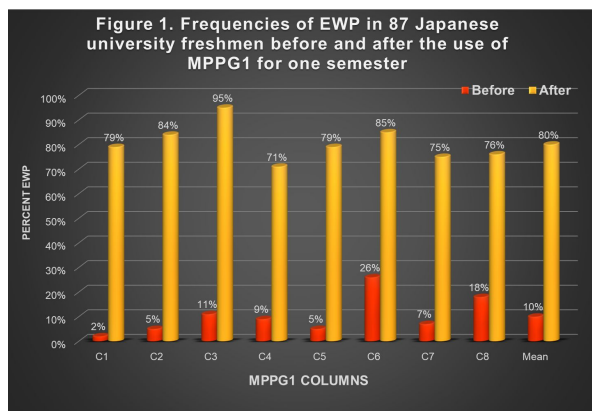
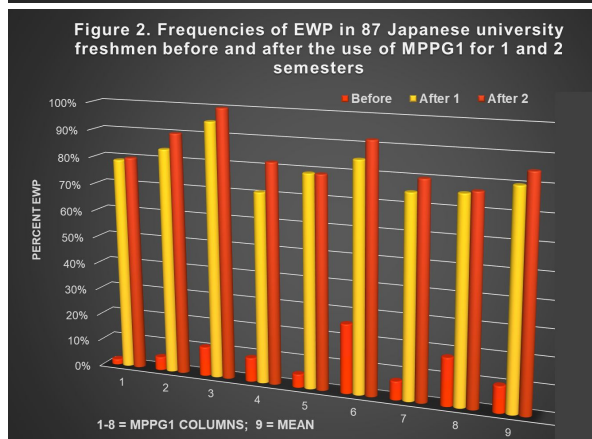
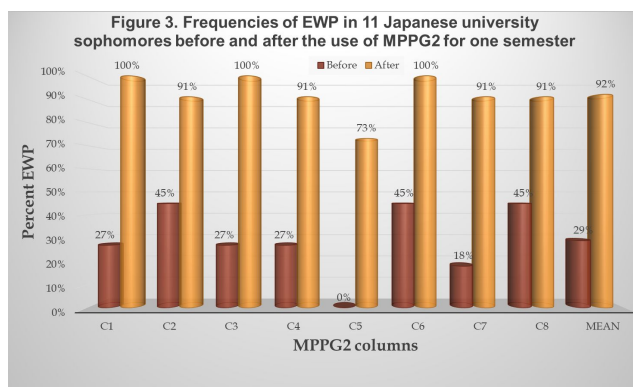


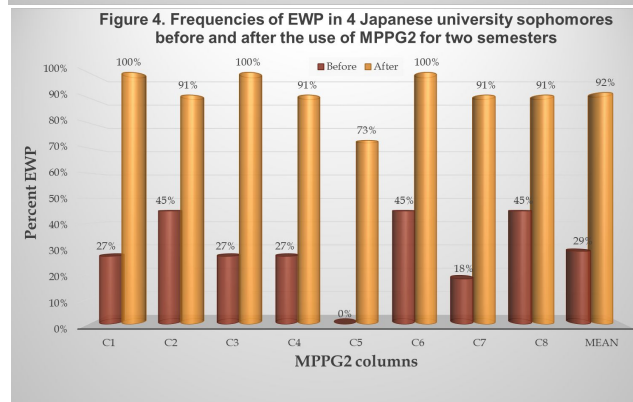
Figure 2 shows the results for the same group of students as in Figure 1 after the use of MPPG1 for one and two semesters. As apparent, the tendency for increased EWP frequencies continued into the second semester with the most significant increase observed again for C3 where the EWP value reached 100%.



The results of test trial of MPPG2 after the use of the guide for one semester in 11 health sciences sophomores are shown in Figure 3. Although the number of students in this group was



much smaller than that in the test trial of MPPG1, again, the data showed a remarkable increase in EWP frequencies after the use of MPPG2 for only one semester. In particular, the frequencies of EWP increased above 90% for seven of the eight word-sets in the guide.



The test trial data for sophomores after the use of the MPPG2 for two semesters are shown in Figure 4. There were only four students in this group and it was not possible to draw any definitive conclusions statistically but still the tendency for increase in EWP frequencies after the practice period was remarkably apparent.

In none of the four test trials and in none of the eight columns in either of the two guides, a decrease in EWP frequencies was observed.

In a course evaluation questionnaire administered at the end of both the freshmen and sophomore courses, when asked the question: "Do you think that MPPG1 was useful to learn and practice pronunciation?" 95% of the freshmen and 100% of the sophomores replied "YES." Two typical reasons for this response given by the students were: "I was able to know the correct pronunciation," and "I realized that I was reading the wrong way up to now."

Discussion

Results of the test trials of MPPG1 and MPPG2 described in this report provide strong evidence for effectiveness of the guides in minimizing L1 interference in the pronunciation of English medical terms by Japanese learners of English. Increase in the EWP frequencies in the students after the use of the guides for only one semester is striking. Data suggest that it is critical for the learners to recognize the differences and be able to distinguish between the EWP and JWP of the English words in order to minimize interference from their L1. Once the students could do that through the use of the guides, they showed a remarkable improvement in their pronunciation.

Effective communication among healthcare team members and between healthcare professionals and patients is indispensable for safe and reliable healthcare delivery^{8,9}). Accordingly, acquiring an intelligible English pronunciation is indispensable for English language learners aiming for careers in medicine and allied disciplines. In Japan, following the global trends to raise medical professionals who can work effectively in an increasingly globalized world, colleges and universities with programs in healthcare are beginning to replace general English courses with those focusing on English for medical purposes in their undergraduate curricula. However, intelligibility issues related to learners' oral communication are among the major challenges faced by these programs⁷).

The MPPG1 and MPPG2 are simple and easy to use both by the teachers and the learners and present as new tools that can be utilized in Japanese healthcare programs to improve learners' intelligibility in oral communication. Incorporation of pronunciation practice in the Japanese medical English classrooms using these guides can help minimize interference by the learners' mother tongue and give them communicative power and confidence.

The findings of the present study do not support the common perception among teachers of English that teaching pronunciation can be difficult or inhibiting for the learners⁴). Instead, as described in this report, students who used the two guides clearly found them useful to practice and learn correct pronunciation without hesitation.

Conclusion

The guides developed in this research offer a practical approach to minimizing L1 interference in Japanese healthcare professionals. It is anticipated that the use of MPPG1 and MPPG2 can contribute significantly to improving the communicative abilities of Japanese learners in healthcare disciplines, build their confidence in speaking the language, develop their overall ability to speak English accurately and fluently, and thereby prepare them as better, more effective and more successful healthcare professionals in a rapidly globalizing Japan and beyond.

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5. 主な発表論文等

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〔図書〕 計0件

〔産業財産権〕

〔その他〕

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6. 研究組織

氏名 (ローマ字氏名) (研究者番号)	所属研究機関・部局・職 (機関番号)	備考

7. 科研費を使用して開催した国際研究集会

〔国際研究集会〕 計0件

8 . 本研究に関連して実施した国際共同研究の実施状況

共同研究相手国	相手方研究機関
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