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From the editor

Greetings to everyone!

I would like to begin by expressing my sincere gratitude to Emeritus Professor Timothy Minton of Keio University, who has served as the Editor-in-Chief of our journal for the past decade. His exceptional dedication and hard work have greatly contributed to the success of JMEE, and I am deeply appreciative of the invaluable guidance he continues to provide.

I would also like to take this opportunity to thank the dedicated members of the Editorial Committee for their significant efforts in promoting the peer review process. Additionally, I extend my gratitude to the numerous unnamed reviewers whose contributions are vital in upholding the publication standards of our journal, and also to the Secretariat for their continuous support in handling the publications.

The field of academic publishing has evolved dramatically in recent years, particularly with the development of artificial intelligence (AI). This shift has led to an increased emphasis on journal guidelines, publication policies, and most importantly, author responsibilities. As AI tools have become more readily available for writing, translating, and editing medical and scientific papers, manuscript preparation has become more manageable for researchers. Needless to say, it is crucial for researchers to thoroughly understand their ethical obligations as authors to ensure compliance with ethical standards. As JMEE serves as the society journal for JASMEE, we are committed to enhancing medical English education, not only through classroom teaching but also in fostering young researchers capable of making significant contributions to the medical field through research and publication on a global scale. To achieve this, I feel it is essential to prioritize maintaining our journal's quality and standards while adapting to the evolving needs of our society.

While the number of submissions to JMEE may be modest, the quality of contributions remains high, and is undoubtedly valuable to those engaged in medical English education worldwide. This issue features manuscripts on some of the presentations from the 27th Annual Academic Meeting held in Nagoya in July 2024, under the leadership of Congress President Professor Shinobu Hattori. As a society journal, we look forward to continuing our collaborative efforts with all JASMEE members, and welcome further contributions to our field.

Takako Kojima

Editor-in-Chief

Journal of Medical English Education

医療通訳者における職業継続関連要因に関する研究

A study on the factors associated with career continuance among medical interpreters

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要旨

目的: 外国人患者の受入れが高まる一方、医療通訳者の報酬や身分が不安定である上、雇用や人材育成が立ち後れている。需要の割に人手不足の医療通訳者の職業継続の確保は重要な課題となっている。本研究では、医療通訳者が職業を継続するために必要な要因を解明することを目的とする。

方法: 現役医療通訳者、経験者等 109 名を対象にし、質問を Google forms で実施した。職業継続意識と専門知識習得の有無、雇用形態の満足度、平均報酬との関連について、ロジスティック回帰を用いて検討した。また、専門知識を習得した通訳者の中で、訓練機関、及び専門知識が現場で役立つ機会がある者の割合について検討した。

結果: 職業継続意識のある通訳者の割合は、育成機関で専門知識の習得がある通訳者 (オッズ比 = 3.05, 95%CI : 1.16-8.00)、雇用形態の満足度が高い通訳者 (オッズ比 = 13.7, 95%CI : 2.35-79.8) で、それぞれがない通訳者に比べて高いことが認められた。さらに、専門知識習得がある通訳者では、訓練機関の内訳として、通訳学校が 59%、NPO などが 25%、その他が 12%、受けたことがないが 4%であった。また、その約 9 割が、専門知識が現場で役立つ機会があると答えた。

結論: 育成機関で専門知識を学び、雇用形態に満足している通訳者では、職業継続意識がある割合が高いことが認められた。専門知識を習得した通訳者は、専門性が高い訓練機関で学び、その専門知識を現場で役立てる機会が多いことが明らかになった。医療通訳者が継続して仕事に従事するためには、専門知識が学べる育成機関及び雇用の拡充が重要であると考えられる。

Abstract

Objectives: While the acceptance of foreign patients is increasing in Japan, the remuneration of medical interpreters is unstable and there is a shortage of manpower to meet the demand. Therefore, this study identifies the factors necessary for medical interpreters to continue their profession.

Method: We distributed questionnaires to 109 people using Google Forms, including current and medical interpreters with experience. A logistic regression analysis was performed to examine the relationship between intention to continue working, acquisition of specialized knowledge, satisfaction with employment type, and average remuneration. Among those who acquired professional knowledge, we examined the proportion attending training institutions and having opportunities to use their professional knowledge.

Results: The proportion of interpreters who intend to stay in their profession was higher among those who acquired professional knowledge at training institutions (OR = 3.05, 95%CI: 1.16-8.00) and those highly satisfied with their employment status (OR = 13.7, 95%CI: 2.35-79.8) than among interpreters who had neither of these. Among interpreters who acquired professional knowledge, 59% attended interpreting schools, 25% non-profit organizations, 12% reported others, and 4% never received training. Approximately 90% of interpreters had an opportunity to apply their professional knowledge in the field.

Conclusion: Most interpreters who acquire professional knowledge at training institutions and are satisfied with their employment status desire to continue working. Further, interpreters who acquire professional knowledge have more opportunities to study at professional training institutions and apply that professional knowledge in the field. For medical interpreters to continue working, it is important to expand training institutions where they can gain professional knowledge and employment.

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Keywords medical interpreters, continuation of employment, related factors, professional knowledge, training institutions, employment type

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1. 序 論

2022年6月末現在における中長期在留者数¹は266万9,267人、特別永住者数は29万2,702人で、これらを合わせた在留外国人数は296万1,969人となり、前年末(276万635人)に比べ、20万1,334人(7.3%)増加、外国人入国数²は62万1,112人で前年同期と比べ47万9,945人増加した。国籍・地域別在留外国人¹では、中国が全体の25.1%を占め、以下、ベトナム16.1%、韓国13.9%、フィリピン9.8%、ブラジル7.0%の順で英語圏以外の外国籍住民が多い。新型コロナウイルス感染症の影響で、2020年より訪日外国人の数は落ち込んでいるが、日本国内で就労する在留外国人がいるため、病院の外国人患者受け入れ態勢の必要性は依然として高い。ところが医療通訳者の活用などに関する法整備が進まず、外国人患者への診療環境が整っていないことから、大半の医療通訳はボランティアや派遣されるアルバイトが対応しており、職業として定着していない。欧米に比べ、日本では医療通訳者の職業化は進まず、通訳者の報酬や身分保障が不安定である上、人材育成のあり方も大きく立ち後れている。日本における医療通訳者の育成は重要な課題だが、現状では³医療機関に正式な訓練を受けたプロ通訳者が少なく、患者の家族、友人、医療者など、通訳とは関係のないバックグラウンドの人がアドホック通訳者となることも多く、コミュニケーション不全、病状の悪化につながる恐れがあることが問題視されてきた。結果的に外国人患者の受診控えや健康格差の広がり、医療の質の低下といった問題が生じることが懸念される。従って、需要の割に人手不足の医療通訳者の職業継続の確保は重要な課題となっている。質の高い医療通訳者が安定して仕事を続けるために必要な要因を解明することが期待される。

米国は英語が話せない患者への医療サービスの提供が1964年の公民権法第6条⁴や2001年の大統領令で義務付けられている。連邦法・州法^{4,6}により、連邦政府からの補助を受けている規模の大きな総合病院は、基本的に、英語が不自由な患者に医療通訳を付けることを義務付けている。医療通訳の配置にかかる費用は政府からの資金援助がある。アメリカで医療通訳となる条件は次の通りである。⁷ ①高卒以上の学歴、②英語習得の証明、③英語と自

国語での通訳能力、④合計40時間の医療通訳研修の受講、⑤ Certification Commission for Healthcare Interpreters (CCHI) または Certified Medical Interpreter (CMI) の資格試験に合格。さらに、イギリスでは、言葉の壁がある患者の診察¹⁰には、病院側が通訳を手配することが患者の権利として NHS (National Health Service)¹¹ で定められている。英語の話せない外国人患者への医療通訳サービスや、通院が難しい患者への送迎サービスなども、すべて国が持つてくれる。一方で患者の家族や友人はもちろん、プロの医療通訳であっても、患者が手配をした医療通訳者を使うことができない。誤訳などの責任の所在、主観が入らない客観的な通訳でなければいけないことなどが理由である。また、オーストラリアは公的医療機関においては、⁶ 英語を話さない患者さんに対して医療通訳サービスの無料提供が義務付けられている。公的医療機関以外では、民間の医療通訳派遣サービスを利用するか、TIS National¹³ を利用することになっている。TIS National は「Translating and Interpreting Service」であり、全国毎日24時間170種類以上の言語・方言に対応可能な通訳・翻訳サービスである。患者は無料で TIS National に電話通訳を手配するように依頼することが出来る。これは政府が提供する移住者支援の一環である。通訳報酬は¹⁴ 通訳者の経験やレベルによるが1時間5,000円～10,000円が相場のようなのだ。医療通訳者の質を担保されるためには、公的な認証を受け、公的医療システムに関する特別な訓練、医学専門用語研修、定期講習など州政府が費用を負担して実施するいくつかの研修を受けなくてはならない。フランスには、¹⁵ 主要な大学病院や国際病院を中心に通訳を配置している。また通訳協会の提供する同行・遠隔・電話通訳182言語の通訳も利用できる。公立病院が¹⁶ 日本でいう NPO に相当する団体と協定を締結している。外国人が多く、医療通訳のニーズが高い病院では、医療通訳者が配置されており、病院からの依頼に応じて、電話による通訳サービスや通訳派遣業務も行われている。

日本では医療通訳者の国家資格がない。医療現場で通訳する人への訓練や研修も義務付けられていない。日本で通訳者養成を含む医療通訳システムを担うのは一部地域の NPO 法人、国際交流協会、病院といった法人や医療機関であるが、全国レベルでの研修制度、認定制度などは未整備である。さらに通訳専門の研修を実施している自治体や機関は限られており、病院や医療機関が訓練を受けた医療通訳者と接触することは容易ではない。そのため、日本語で意思疎通が難しい患者への対応は、患者が連れてくるアドホック通訳者¹⁷ を利用して診療せざるを得ないのが現状である。アドホック通訳者を介すと積極的なコミュニケーションは難しく、また正確さに欠ける可能性も指摘される。¹⁸ 実

際に、移民先進国のアメリカでは「訓練を受けた医療通訳の有効性」^{19,20}「訓練をうけていないアドホック通訳者の正確性やその悪影響・悲惨な医療過誤」^{21,22}が報告されている。

医療通訳の役割に関する、日本の厚生労働省^{23,24}の定義では、「言語、文化的・社会的背景に違いのある外国人患者と医療従事者の間に言葉の媒介者と文化の仲介者として入り、通訳技能と医学知識を用いて相互理解を支援する専門職と考えられる」とされているが、その報酬は²⁵一般通訳の10分1程度と言われ、十分ではないのが現状である。アメリカの医療通訳者の平均時給は26USドルであり、日本のいくつかの自治体が公共目的で運営している医療通訳制度報酬（日本の時給1,000～1,500円程度）の2倍ほどとなっている。²⁶医療通訳制度が十分に普及していない日本で有償通訳の利用を促すためやむを得ない金額設定だとみることができ、医療通訳者の仕事として生計を立てるにはほど遠い。さらに、日本における医療通訳は、²⁶通訳者が医療スタッフの一員として高い専門性を要求され、人命に関わる重大な責任を負うにもかかわらず、制度の未整備や資金面での問題などから実際にはボランティア通訳の守備範囲であると認識されているのが現状である。外国人の集住地域や外国人顧客相手に常に医療通訳者が必要な場合は、医療機関や会社が医療通訳者を雇用することもあるが、大半は報酬が低いのに高度なスキルや重責を求められるため継続が難しく、多くの優秀な通訳者が医療現場から去って行ったため、医療通訳者の定着率が低いという問題が生じている。²⁷現在の制度では医療通訳者に対する生活保障が不十分であることから、熟練した通訳者が転職等の理由で辞めることが多い。²⁸医療通訳の従事者は生計維持のためより安定した職業を求める傾向があり、ほぼ5年程度で離職するため、熟練人材の確保に支障をきたしている。²⁸需要の高さの割に人手が足りない医療通訳者の職業継続の確保は重要な課題となっている。

これらの点を踏まえ、本研究では、現役医療通訳者や医療通訳経験者等を対象に、基本情報、訓練状況、雇用形態・待遇、医療通訳の形態、職業継続意識をアンケート調査し、質の高い医療通訳者が安定して仕事を続けるために必要な要因を解明することを目的とする。

2. 方法

2.1 調査対象と調査方法

2023年2月から5月にかけて、現役医療通訳者（医療通訳学会、医療通訳派遣会社、医療通訳派遣NGO/NPO、病院、医療機関、通訳学校、知人）、医療通訳経験者等を対象に、GoogleFormsを使用して自記式無記名のオンライン形式の

質問紙調査を用いて実施した。質問紙は計2,696名に配布し、48団体にご協力頂き、109名の有効回答を得られた（回答率4.0%）。

2.2 倫理的配慮

調査依頼文には、研究目的、対象および対象者数、調査方法、調査期間および研究協力は自由意思であること、研究協力者のプライバシーを保護するとともに個人の匿名性を確保すること、調査結果は研究の目的以外に使用しないことを記載した。同意のチェックボックスを設け、チェックした人のみ先に進めるようにし、チェックがあった場合は調査への同意が得られたとみなした。また、データ論文としてまとめ学会発表や論文投稿を予定していることを記載した。なお、本調査は、順天堂大学研究倫理審査委員会の審査を受け、承諾を得た後に実施した（承認番号E21-0235-M03 承認年月日2023年1月13日）。

2.3 調査項目

質問項目は基本属性、医療通訳訓練状況、雇用形態・待遇、医療通訳の形態、と職業継続意識の5つの群から構成され、約10分の回答時間を要する。

基本属性について、性別（女性/男性）、年齢、地域、通訳歴、母語（日本語/英語/中国語/スペイン語/その他）、通訳言語（日本語/英語/中国語/スペイン語/その他）、最終学歴（専門学校/短期大学/学士（4年制大学）/大学院修士/大学院博士）を質問項目とした。

訓練状況については、訓練機関（大学・大学院の医療通訳養成講座/通訳学校の医療通訳養成講座/NGO（非政府組織）、NPO（非営利組織）などの医療通訳養成講座/養成機関での訓練は受けていない）、訓練時間、その訓練は厚生労働省のカリキュラムに準拠しているか（している/していない/わからない）、医療通訳育成機関で医療通訳に関する専門知識を学んだか（学んだ事がなかった/学んだ）、学んだ医療通訳に関する専門知識は実際の通訳現場で役に立つと思うか（全くそう思わない/あまりそう思わない/どちらとも言えない/そう思う/強くそう思う）を質問項目とした。

雇用・待遇については、雇用形態（病院勤務（正職員）/病院勤務（契約社員、パート、アルバイト、ボランティア）/通訳会社・機関（正職員）/通訳会社・機関（契約社員、パート、アルバイト、ボランティア）/フリーランス（個人事業主、自営業）/その他）、報酬満足度（多い/どちらかと言えば多い/適正/どちらかと言えば少ない/少ない）、雇用形態の満足度（満足/やや満足/やや不満/不満）、希望する雇用形態（病院勤務（正職員）/病院勤務（契約社員、

パート、アルバイト、ボランティア) / 通訳会社・機関 (正職員) / 通訳会社・機関 (契約社員, パート, アルバイト, ボランティア) / フリーランス (個人事業主, 自営業) / その他) を質問項目とした。

通訳形態については、通訳形態の種類を質問項目とした。報酬について、2019年1月～2020年1月対面通訳の平均報酬、2020年1月～現在対面通訳の平均報酬、遠隔通訳の平均報酬を質問項目とした。

職業継続意識については、職業継続意識は「現在の職業を長く続けたいと思いますか」に対して、「できるだけ長く続けたい」、「長く続けたい」の回答を「はい」と見なし、「どちらとも言えない」、「早く辞めたい」、「出来るだけ早く辞めたい」の回答を「いいえ」と見なす。

2.4 分析方法

基本情報は、職業継続意識の有無による基本情報の差異は、カイ二乗検定を用いて検討した。職業継続意識と育成機関での専門知識の習得の有無、雇用形態の満足度、平均報酬との関連については、性別・年齢で調整した多重ロジスティック回帰分析を用いて検討した。

また、育成機関での専門知識の習得の有無と訓練状況群との関連をカイ二乗検定を用いて検討した。専門知識の習得がある者の訓練機関情報、及び専門知識が現場で役立つ機会については割合を算出した。

3. 結果

1. 医療通訳者の基本属性について表1に示した。性別は女性94人、男性15人、年齢構成は40代が最も多く34人、次いで30代29人、50代23人であった。地域は東京都が78人、東京都以外が28人であった。母語は中国語が67人、日本語が41人、韓国語が1人であった。通訳言語は日本語が60人、英語が32人、中国語が15人であった。訓練状況について、訓練機関は通訳学校が51人、NGO、NPOなどが28人、受けたことがないと回答した者が18人であった。訓練時間は、「100時間以上」が32人、「40～60時間未満」が22人、「20～40時間未満」が14人であった。厚生労働省のカリキュラムを基準にしているかについては、「している」が67人、「わからない」が14人、「していない」が10人であった。医療通訳育成機関で医療通訳に関する専門知識を学んだ者は80人であった。学んだ専門知識は現場で役に立つと思う者は89人であった。雇用・待遇について、雇用形態は正規雇用の数が少なく、フリーランスが35人、会社非正規雇用が26人、病院正規雇用が18人、会社正規雇用が14人で、病院非正規雇用が9人、ボランティアが3

人であった。報酬満足は「適正」が47人、「どちらかと言えば少ない」が37人、「少ない」が20人、「どちらかと言えば多い」が5人であった。雇用形態満足度は「やや満足」が39人、「満足」が30人、「やや不満」が28人、「不満」が12人であった。通訳形態について、通訳形態は「対面通訳」が68人、「対面通訳・遠隔通訳」が33人、「遠隔通訳」が5人であった。2019年1月～2020年1月の対面通訳の平均報酬は「なし」が43人、「10万円未満」が28人、「10万円以上」が28人であった。遠隔通訳の平均報酬は「なし」が80人、「10万円未満」が18人、「10万円以上」が5人であった。職業継続意識がある者は73人であった。

2. カイ二乗検定で職業継続意識と各項目との関連を検討した(表1)。結果、職業継続意識は育成機関で専門知識の習得(有:73.4%vs無:26.6%; $p=0.01$)、雇用形態の満足度(満足:27.5%, やや満足:35.8%, やや不満25.7%; 不満:11.0%; $p=0.01$)、2019年～2020年対面通訳の平均報酬(10万円以上:28.3%, 10万円未満:28.3%, なし:43.4%; $p=0.03$)との間に有意な関連が示された。

3. 職業継続意識と育成機関での専門知識の習得の有無、雇用形態の満足度、平均報酬との関連について検討した(表2-4)。職業継続意識のある通訳者の割合は、育成機関で専門知識習得(オッズ比=3.05, 95%CI:1.16-8.00)と有意な関連が示された(表2)。また、職業継続意識のある通訳者の割合は、雇用形態の満足度(オッズ比=13.7, 95%CI:2.35-79.8)と有意な関連が示された(表3)。しかし、報酬と職業継続意識との関連は認められなかった(表4)。

4. カイ二乗検定で育成機関で専門知識の習得の有無と訓練状況群の各項目との関連性を検討した結果、育成機関で専門知識の習得は訓練期間によって、異なることが示された(表5)。通訳学校やNGO・NPOなどの医療通訳養成講座等を受けた者は、受けなかった者に比べて(通訳学校:46.8%, NGO・NPO等:25.7%, その他:11.0%, 受けたことがない:16.5%; $p<0.001$)、専門知識を習得した割合が高い。専門知識の習得と現場で専門知識が役立つ機会との間に有意な関連が示された(思う:81.7%, どちらとも言えない:11.9%, 思わない:6.4%; $p<0.001$)。

また、専門知識習得が有る通訳者では、訓練機関の内訳として、通訳学校が59%、NPOなどが25%、その他が12%、受けたことがないが4%であった。専門知識の習得がある通訳者は、専門性が高い訓練機関で学んだ者の割合が高かった(図1)。専門知識が現場で役立つ機会の内訳として、思うが90%、どちらとも言えないが5%、思わないが5%であった。専門知識の習得がある通訳者は、その専門知識を現場で役立てる機会が多かった(図2)。

表 1. 医療通訳の職業継続意識と基本属性

項目 基本情報	全体 (n = 109)	N	%	医療通訳の継続意識		p 値
				ある	なし	
性別	女性	94	86.2%	66 (60.6%)	28 (25.7%)	0.06
	男性	15	13.8%	7 (6.4%)	8 (7.3%)	
年代	20 代	7	6.4%	3 (2.8%)	4 (3.7%)	0.37
	30 代	29	26.6%	21 (19.3%)	8 (7.3%)	
	40 代	34	31.2%	23 (21.1%)	11 (10.1%)	
	50 代	23	21.1%	17 (15.6%)	6 (5.5%)	
	60 代	11	10.1%	5 (4.6%)	6 (5.5%)	
	70 代	5	4.6%	4 (3.7%)	1 (0.9%)	
地域	東京都	78	71.6%	57 (52.3%)	21 (19.3%)	0.09
	東京都以外	28	25.7%	15 (13.8%)	12 (11.0%)	
	未活動	3	2.7%	—	—	
通訳歴	1 年未満	33	30.3%	21 (19.3%)	12 (11.0%)	0.64
	1 ~ 3 年	14	12.8%	10 (9.2%)	4 (3.7%)	
	3 ~ 5 年	23	21.1%	18 (16.5%)	5 (4.6%)	
	5 ~ 10 年	32	29.4%	19 (17.4%)	13 (11.9%)	
	10 年以上	7	6.4%	5 (4.6%)	2 (1.8%)	
母語	中国語	67	61.5%	48 (44.0%)	19 (17.4%)	0.19
	日本語	41	37.6%	25 (22.9%)	16 (14.7%)	
	韓国語	1	0.9%	0 (0.0%)	1 (0.9%)	
通訳言語	日本語	60	55.0%	41 (37.6%)	19 (17.4%)	0.54
	中国語	15	13.8%	11 (10.1%)	4 (3.7%)	
	英語	32	29.4%	19 (17.4%)	13 (11.9%)	
	その他	2	1.8%	2 (1.8%)	0 (0.0%)	
最終学歴	修士	23	21.1%	16 (14.7%)	7 (6.4%)	0.90
	学士	67	61.5%	45 (41.3%)	22 (20.2%)	
	専門学校	9	8.3%	5 (4.6%)	4 (3.7%)	
	短期大学	9	8.3%	6 (5.5%)	3 (2.8%)	
	その他	1	0.9%	1 (0.9%)	0 (0.0%)	

項目 訓練状況	全体 (n = 109)	N	%	医療通訳の継続意識		p 値
				ある	なし	
訓練機関	通訳学校	51	46.8%	38 (34.9%)	13 (11.9%)	0.11
	NGO, NPO 等	28	25.7%	20 (18.3%)	8 (7.3%)	
	その他	12	11.0%	7 (6.4%)	5 (4.6%)	
	受けていない	18	16.5%	8 (7.3%)	10 (9.2%)	
訓練時間	20 ~ 40 時間	14	15.4%	9 (9.9%)	5 (5.5%)	0.62
	40 ~ 60 時間	22	24.2%	15 (16.5%)	7 (7.7%)	
	60 ~ 80 時間	11	12.1%	10 (11.0%)	1 (1.1%)	
	80 ~ 100 時間	12	13.2%	8 (8.8%)	4 (4.4%)	
	100 時間以上	32	35.2%	23 (25.3%)	9 (9.9%)	
厚労省の基準に している	している	67	73.6%	48 (52.7%)	19 (20.9%)	0.61
	していない	10	11.1%	6 (6.6%)	4 (4.4%)	
	わからない	14	15.4%	11 (12.1%)	3 (3.3%)	
専門知識の習得	学んだ	80	73.4%	59 (54.1%)	21 (19.3%)	0.01
	学んでいない	29	26.6%	14 (12.8%)	15 (13.8%)	
専門知識は現場で 役に立つ	思う	89	81.7%	62 (56.9%)	27 (24.8%)	0.23
	どちらとも	13	11.9%	6 (5.5%)	7 (6.4%)	
	思わない	7	6.4%	5 (4.6%)	2 (1.8%)	

表 1 (つづき)

項目 雇用・待遇	全体 (n = 109)	N	%	医療通訳の継続意識		p 値
				ある	なし	
雇用形態	会社正規	14	12.8%	10 (9.2%)	4 (3.7%)	0.11
	病院正規	18	16.5%	10 (9.2%)	8 (7.3%)	
	会社非正規	26	23.9%	21 (19.3%)	5 (4.6%)	
	病院非正規	9	8.3%	7 (6.4%)	2 (1.8%)	
	フリーランス	35	32.1%	23 (21.1%)	12 (11.0%)	
	ボランティア	3	2.8%	0 (0.0%)	3 (2.8%)	
	その他	4	3.7%	2 (1.8%)	2 (1.8%)	
報酬満足	言えば多い	5	4.6%	4 (3.7%)	1 (0.9%)	0.60
	適正	47	43.1%	32 (29.4%)	15 (13.8%)	
	言えば少ない	37	33.9%	26 (23.9%)	11 (10.1%)	
	少ない	20	18.3%	11 (10.1%)	9 (8.3%)	
雇用形態 の満足度	満足	30	27.5%	24 (22.0%)	6 (5.5%)	0.01
	やや満足	39	35.8%	26 (23.9%)	13 (11.9%)	
	やや不満	28	25.7%	20 (18.3%)	8 (7.3%)	
	不満	12	11.0%	3 (2.8%)	9 (8.3%)	
希望する 雇用形態	会社正規雇用	15	13.8%	12 (11.0%)	3 (2.8%)	0.15
	病院正規雇用	23	21.1%	15 (13.8%)	8 (7.3%)	
	会社非正規雇用	24	22.0%	19 (17.4%)	5 (4.6%)	
	病院非正規雇用	13	11.9%	7 (6.4%)	6 (5.5%)	
	フリーランス	32	29.4%	20 (18.3%)	12 (11.0%)	
	その他	2	1.8%	0 (0.0%)	2 (1.8%)	

項目 通訳形態	全体 (n = 109)	N	%	医療通訳の継続意識		p 値
				ある	なし	
通訳形態	対面通訳	68	62.4%	44 (40.4%)	24 (22.0%)	0.23
	対面・遠隔通訳	33	30.3%	21 (19.3%)	12 (11.0%)	
	遠隔通訳	5	4.6%	5 (4.6%)	0 (0.0%)	
	活躍していない	3	2.8%	3 (2.8%)	0 (0.0%)	
対面通訳 報酬 (n = 99)	10 万円以上	28	28.3%	22 (22.2%)	6 (6.1%)	0.03
	10 万円未満	28	28.3%	22 (22.2%)	6 (6.1%)	
	なし	43	43.4%	23 (23.2%)	20 (20.2%)	
対面通訳 報酬 (n = 104)	10 万円以上	25	24.0%	16 (15.4%)	9 (8.7%)	0.40
	10 万円未満	27	26.0%	21 (20.2%)	6 (5.8%)	
	なし	52	50.0%	33 (31.7%)	19 (18.3%)	
遠隔通訳 (n = 103)	10 万円以上	5	4.9%	3 (2.9%)	2 (1.9%)	0.63
	10 万円未満	18	17.5%	14 (13.6%)	4 (3.9%)	
	なし	80	77.7%	54 (52.4%)	26 (25.2%)	

項目	全体 (n = 109)	N	%	医療通訳の継続意識	
				ある	なし
職業継続意識	はい	73	67.0%	—	—
	いいえ	36	33.0%	—	—

表 2. 職業継続意識と育成機関での専門知識の習得の有無との関連

項目	N	単変量解析		p 値	多変量解析		p 値
		OR	95%CI		OR	95%CI	
専門知識の習得有	80	1.00			1.00		
専門知識の習得無	29	3.01	1.25-7.27	0.01	3.05	1.16-8.00	0.02

※性別・年齢で調整

OR : Odds Ratio, CI : Confidence Interval

表 3. 職業継続意識と雇用形態の満足度との関連

項目	N	単変量解析		p 値	多変量解析		p 値
		OR	95%CI		OR	95%CI	
満足	30	1.00			1.00		
やや満足	39	2.00	0.66-6.10	0.22	2.32	0.66-8.18	0.19
やや不満	28	1.60	0.46-5.38	0.45	1.60	0.41-6.23	0.50
不満	12	12.0	2.46-58.5	0.02	13.7	2.35-79.8	0.004

※性別・年齢で調整

OR : Odds Ratio, CI : Confidence Interval

表 4. 職業継続意識と平均報酬との関連

項目	N	単変量解析		p 値	多変量解析		p 値
		OR	95%CI		OR	95%CI	
2019年～2020年 対面 10万円以上	28	1.00			1.00		
2019年～2020年 対面 10万円未満	28	1.00	0.28-3.58	1.00	0.77	0.19-3.09	0.71
2019年～2020年 対面なし	43	3.19	1.08-9.42	0.04	2.47	0.77-7.88	0.13

※性別・年齢で調整

OR : Odds Ratio, CI : Confidence Interval

表 5. 訓練状況に関する項目と育成機関で専門知識の習得有無との関連

項目	全体 (n = 109)		育成機関で専門知識の習得		p 値
	N	%	ある 80 (73.4%)	なし 29 (26.6%)	
訓練機関 (n = 109)					
通訳学校	51	46.8%	47 (43.1%)	4 (3.7%)	< 0.001
NGO, NPO など	28	25.7%	20 (18.3%)	8 (7.3%)	
その他	12	11.0%	10 (9.2%)	2 (1.8%)	
受けたことがない	18	16.5%	3 (2.8%)	15 (13.8%)	
訓練時間 (n = 91)					
20～40時間未満	14	15.4%	9 (9.9%)	5 (5.5%)	0.14
40～60時間未満	22	24.2%	21 (23.1%)	1 (1.1%)	
60～80時間未満	11	12.1%	9 (9.9%)	2 (2.2%)	
80～100時間未満	12	13.2%	11 (12.1%)	1 (1.1%)	
100時間以上	32	35.2%	27 (29.7%)	5 (5.5%)	
厚労省の基準にしているか (n = 91)					
している	67	73.6%	60 (65.9%)	7 (7.7%)	0.09
していない	10	11.1%	7 (7.7%)	3 (3.3%)	
わからない	14	15.4%	10 (11.0%)	4 (4.4%)	
希望するトレーニング (n = 109)					
正確な通訳のため	42	38.5%	29 (26.6%)	13 (11.9%)	0.18
医療用語や人体	27	24.8%	22 (20.2%)	5 (4.6%)	
遠隔通訳	22	20.2%	19 (17.4%)	3 (2.8%)	
異文化交流	6	5.5%	3 (2.8%)	3 (2.8%)	
その他	12	11.0%	7 (6.4%)	5 (4.6%)	
専門知識は現場で役に立つか? (n = 109)					
思う	89	81.7%	72 (66.1%)	17 (15.6%)	< 0.001
どちらとも言えない	13	11.9%	4 (3.7%)	9 (8.3%)	
思わない	7	6.4%	4 (3.7%)	3 (2.8%)	

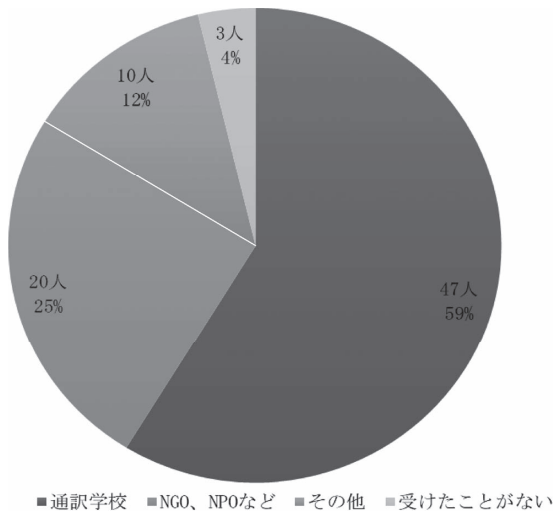


図 1. 専門知識の習得がある者の中で、訓練機関別の割合

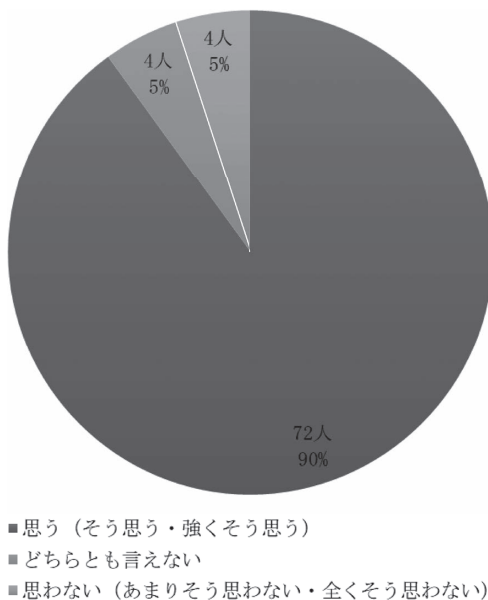


図 2. 専門知識の習得がある者の中で、専門知識が現場で役立つ機会ある者の割合

4. 考 察

本研究に参加した 109 人のうち約半数の 51 人 (46.8%) が医療通訳学校で訓練を受けた一方で、全く訓練を受けていない通訳者も 18 人 (16.5%) いることが明らかになった。医療通訳者の技能と質の向上の為、専門知識が学べる育成制度と環境の設置が重要である。日本の現状では、医療通訳者には国家資格や公的資格の制度がなく、複数の民間企業や団体が医療通訳に関する技術を評価認定する目的で独自の試験を行っている。現在実施されている医療通訳に関する民間の認定試験²⁹は主に一般財団法人日本教育財団や通訳品質協議会などが開催する国際臨床医学会 (ICM)³⁰の医療通訳士の認定試験がある。認定試験では国の厚生労働省が制定した「医療通訳育成カリキュラム基準」に基づき、

診療所、一般病院などにおける対話コミュニケーションを通訳するために必要な関連知識、技術、倫理を有していることを基準としている。本研究においては、「訓練が厚生労働育成カリキュラムを基準にしているか」の質問に対して、していると回答した通訳者は 73.6%と大半を占める一方で、していない、わからない (26.5%) と回答する通訳者がいることも把握した。医療現場で専門知識を役立たせ、より信頼性が高い医療通訳者を養成する為には、厚生労働育成カリキュラムの基準と訓練の制度を全国的に統一し、認定試験と連携した訓練・養成機関を各地域に設置する必要性があると推察される。

本研究では、医療通訳の平均報酬は「10 万円以下」または「ない」と回答した者、並びに、報酬は少ないと思われる理由として、「責任の重さに比べて、報酬が低い」と回答した者が約 75.4%であった。医療通訳者の身分保障の欠如、役割の重要さの割に報酬が低い、生活保障が不可能などの問題が挙げられる。本研究では、通訳歴 5 年未満と回答した者は 64.2%であった。現状では医療通訳の離職²⁸や転職率が高く、ほぼ 5 年程度で離職する為、定着率の問題や熟練人材の確保に支障があることが懸念される。本研究では、正規雇用を希望する通訳者が多かった (約 35%)。医療通訳者は生計維持より安定した正規雇用を求める傾向が示された。

本研究では、女性は 86.2%と占め、最も活躍している医療通訳者は女性であることが明らかになった。調査対象者の家庭構造や配偶者の状況に関しての調査項目は入れなかったが、経済的な心配がなく、また扶養内で働いていた場合は、報酬を優先しない可能性も推測され、経済的な背景も雇用・報酬満足に影響する要素であると考えられる。

欧米 (アメリカ、イギリス、オーストラリア、フランス) の医療通訳制度における共通点として、政府からの助成金や支援金制度があり、医療通訳サービスが法律で義務付けられ^{4,6,12}無料で提供されると同時に、医療通訳者の報酬も確保される。しかしながら、日本では医療通訳を提供するうえで法的根拠がなく、政府からの補助制度がないため、医療通訳者に十分な報酬が保証されていない²⁵。また、医療通訳者の訓練・認定制度における、アメリカとオーストラリアの共通点として、特定期間の医療通訳研修機関での受講と国家レベルでの統一基準の認定資格試験に合格することが必須である。一方、日本では訓練機関での受講と認定資格試験の合格は必須ではなく、制度として完備されていないのが現実である。日本において医療通訳の需要が高まる中、医療通訳者が安定して職業を続けるには、財源の補助制度や研修訓練・認定制度の改善が望まれる。

5. 限 界

本研究は現役医療通訳者や医療通訳経験者等を対象に質問調査を実施したが、病院と医療機関に常勤している医療通訳者のサンプル数が少ない。今後さらに病院や医療機関で正規雇用されている対象者を増やし、再検討する必要がある。

また、本研究は横断調査の結果に基づいており、因果関係を考察することは難しい。しかしながら、医療通訳者の職業継続意識に関連する要因として、専門知識が学べる育成機関及び雇用の拡充が重要であることが本研究において示された。

6. 結 論

本研究では、育成機関で専門知識を学び、雇用形態に満足している通訳者では、職業継続意識がある割合が高いことが認められた。また、専門知識の習得がある通訳者は専門性が高い訓練機関で学び、その専門知識を現場で役立てる機会が多いことも示された。従って、医療通訳者が継続して仕事に従事するためには、専門知識が学べる育成機関及び雇用の拡充が重要であると考えられる。

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Trends of English questions in the National Examination for Medical Practitioners in Japan and strategies for preparation

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Abstract

Objectives: This study aims to identify patterns in English questions presented in the National Examination for Medical Practitioners in Japan since 2009 and, in turn, suggest appropriate preparation strategies for teachers and students.

Methods: To analyze English questions in the National Examination for Medical Practitioners, three online tools—namely, Flesch Reading Ease, text mining, and New Word Level Checker—were employed for a comprehensive evaluation.

Results: The collective set of questions yielded an average FRE score of 48.9, positioning it near the upper threshold of the difficult category on the Flesch Reading Ease scale. Text mining unveiled a notable prevalence of questions centered around abdominal pain, while the New Word Level Checker pinpointed specific medical terminologies essential for effective preparation.

Conclusions: To excel in English questions on the National Examination for Medical Practitioners, this study recommends immersing oneself in English literature with Flesch Reading Ease values around 48.9. Focus on texts featuring frequently used vocabulary, as identified through the insightful presentation of word clouds. Furthermore, deriving benefit from the memorization of medical terminology categorized as “Level 7 and 8” on the New Word Level Checker, along with other relevant terms that fall outside these specific levels is advisable. Despite the constraints stemming from the limited number of available English questions for examination, future studies hold the potential to unveil more precise trends.

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Keywords National Examination for Medical Practitioners in Japan, Flesch Reading Ease, text mining, New Word Level Checker

1. Introduction

English questions were first introduced into the National Examination for Medical Practitioners in Japan (hereafter referred to as NEMP) in February 2009. Understanding the trends of these English questions is of interest to medical English teachers who want to ensure that their students are sufficiently well-prepared for the NEMP. However, the study

encountered a limitation in conducting a comprehensive assessment due to the overall limited quantity of English questions presented in the NEMP thus far. This perspective was also articulated by Dr. Nakaya Saito from the Honolulu Academy of Medicine during the 25th Japan Society for Medical English Education (JASMEE) academic meeting in 2022.¹ Dr. Saito emphasized that, given the overall number of questions in the NEMP, the ability to answer English questions accurately is not a significant factor in a student's ability to pass. However, despite the limitations of the findings in the present study, the author considers it valuable to explore the emerging trends in English questions.

General questions in English were first included in the 2009 National Medical Examination Criteria. Subsequently, each year has witnessed the incorporation of one to three mandatory medical English questions. The first questions of this nature were vocabulary-type questions. In 2015, reference-type questions were introduced, and by 2020, the format evolved to include three questions, comprising

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one compulsory and two clinical questions, administered in English. This established pattern has been generally adhered to in the format of English questions. Appendix 1 provides a portion of the questions from 2023.

Globalization is impacting many fields, including Japanese medicine. In this global era, a harmonized educational approach is essential, as demonstrated by organizations like the Educational Commission for Foreign Medical Graduates (ECFMG)² in the United States. This need also applies to Japan, where the Japan Accreditation Council for Medical Education (JACME)³ oversees a standardized medical education certification system. As part of global initiatives, the certification process now requires higher English proficiency. With international standards in medical education rising, strong English skills, such as flexible communication, case report writing, and presentation skills are becoming crucial within the global medical community. Moreover, as part of the Top Global University Project by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), 37 Japanese universities, including Tohoku University, The University of Tsukuba, and Tokyo Medical and Dental University, have expanded their English-taught offerings in medical education as of 2022,⁴ particularly for programs targeting international students and global initiatives. Given these trends, the number of English questions in the NEMP is expected to increase.

While these changes aim to enhance global competencies, they also bring potential challenges. The increasing emphasis on English proficiency has raised concerns about the dominance of English contributing to language loss globally. For instance, English has permeated throughout Europe, threatening multilingualism and cultural diversity. In response to the threat of English dominance, some countries have enacted language laws and national language protection laws.⁵ Similarly, Professor Se from Kyushu University points out that:

As the shift towards teaching university courses in English progresses, it will become increasingly difficult for Japanese researchers to write and publish in Japanese. Consequently, Japanese may cease to be a language of academia. Advanced concepts in various fields would not be translated into Japanese, resulting in Japanese lacking such specialized vocabulary.⁶ (p. 180)

Therefore, the purpose of this paper is to analyze past English questions, identify question trends, and convey strategies for handling English questions on the NEMP to both teachers and students. In doing so, it is also important to promote learning in both English and Japanese, as Japanese teachers of English can play a crucial role in helping students understand medical concepts and terminology in both languages. This approach ensures that while English proficiency is enhanced, the Japanese language is also preserved and nurtured. By employing the analysis methods presented here, effective strategies can be demonstrated to

manage the potential increase in English questions while also supporting the use of Japanese in academia.

2. Methods

The analysis of English questions encompassed an evaluation of readability, question trends, and vocabulary difficulty. Flesch Reading Ease,⁷ text mining,⁸ and New Word Level Checker⁹ were employed to assess these dimensions respectively. The Institutional Review Board at Dokkyo Medical University waived review for this study as it did not involve human subjects. The findings from this study were used solely for research and educational purposes.

2.1 Flesh Reading Ease

The Flesch Reading Ease (FRE)⁷ is a readability index crafted to gauge the complexity of a text, assigning it a score ranging from 0 to 100. A higher score suggests that the text is more accessible, with the range of 60 to 70 generally considered acceptable for general readers. The specifics for the FRE score group are presented in Table 2 in the Results section. The formula for FRE, outlined in Appendix 2, was devised in the 1940s by Rudolf Flesch.¹⁰ This scoring system is widely adopted in various fields, including marketing, research communication, and policy writing. It serves as a valuable tool to assess the approximate difficulty levels of language products, ensuring their comprehensibility for a diverse audience.

In this study, the FRE score was computed for all questions except vocabulary-type questions.

2.2 Text mining

Text mining⁸ involves scrutinizing extensive volumes of unstructured documents to identify concepts, patterns, topics, keywords, and various other attributes. A prominent aspect of text mining is the use of word cloud, which visually represents textual data. Words that are rare in broader document sets but exhibit frequent occurrence in the specific document under investigation receive elevated scores. As illustrated in Figure 1 in the Results section, words with the highest frequencies—determined by their scores relative to the surrounding words—are centrally displayed in larger or bolder type. In the word cloud, word colors represent distinct parts of speech: nouns in blue, verbs in red, and adjectives in green. However, Figure 1 is presented in black and white to adhere to the guidelines of this paper. To conduct word cloud analysis, all English questions, including vocabulary-type ones, underwent text mining using User Local AI.⁸

2.3 New Word Level Checker

The New Word Level Checker⁹ is an online tool designed to evaluate the difficulty levels of English texts by employing corpus-based word lists. This tool seamlessly assesses the

complexity of vocabulary within a given text, providing valuable insights into its linguistic details. Within the New Word Level Checker, users can select from six distinct base dictionaries, including New JACET8000,¹¹ JET2020, SVL12000, New General Service List, CEFR-J, and SEWK-J. This feature enables the assessment of the difficulty level for each word in a given text, presenting the results in a coherently organized manner based on lexical complexity. In this study, New JACET8000 was used as the base dictionary and the vocabulary in all English questions was analyzed. New JACET8000 is the updated version of the JACET 8000,¹² an extensive compilation of 8,000 English words published by the Japan Association of College English Teachers (JACET) in 2005. Tailored for Japanese university students, this list is compiled using data extracted from the British National Corpus (BNC). The preface of the JACET 8000 states that by mastering these fundamental 8,000 words, students can expect to be familiar with over 97% of the words encountered in a typical English environment. The basic 8,000 words are divided into eight levels (Table 1).

3. Results

3.1 Flesch Reading Ease (FRE)

The set of all English questions, excluding vocabulary-type ones, was analyzed, yielding an FRE score of 48.9, falling in the “30–49 Difficult” category in Table 2.

The analyzed English questions consisted of a total of 1,087 words (excluding vocabulary questions). To assess the difficulty level within the range of 30 to 49, the author analyzed various passages from both the English exams administered by STEP and articles from English newspapers. The analysis included passages from STEP Grades 2, Pre-1, and 1, as well as articles from *The Japan Times*, a prominent English newspaper. This process involved selecting passages with word counts similar to the 1,087 words found in the English questions in the NEMP and assessing their FRE values. As mentioned in 2.1, a lower FRE score indicates more challenging reading passages, while higher scores signify easier ones. The results are shown in Table 3.

For reference, the correlation between STEP grade levels and the Common European Framework of Reference (CEFR)¹⁴ is presented in Table 4.

It is difficult to generalize the difficulty levels of these four types of texts because the author did not assess all passages in STEP exams and *The Japan Times* to establish their FRE scores. However, based on the scores of the passages analyzed, they can be listed from easiest to most difficult as follows: STEP Grade 2 < English questions in NEMP < *The Japan Times* < STEP Grade Pre-1 < STEP Grade 1, for an approximate picture of their comparison by levels.

3.2 Text mining

Next, a comprehensive analysis of all questions, including

Table 1. Eight levels in JACET8000

Level 1	Common words frequently found in junior high school English textbooks, covering 70% of typical English sentences.
Level 2	High school beginner level, encompassing vocabulary that constitutes 75% of English-language newspapers. Equivalent to STEP* Grade Pre-2.
Level 3	High school English textbooks and university entrance exams are crafted using vocabulary at this level, roughly equivalent to STEP Grade 2. This vocabulary level is deemed essential for an educated individual.
Level 4	Vocabulary proficiency level necessary for university entrance exams and foundational general education at the university level. Equivalent to STEP Grade 2.
Level 5	Relevant for competitive university entrance exams and foundational general education at the university level. Equivalent to STEP Grade Pre-1 or approximately a TOEIC score of 400–500.
Level 6	Level targeted by university students and business professionals outside the field of English specialization. Equivalent to STEP Grade Pre-1, and approximately 600 points in TOEIC.
Level 7	Target proficiency for English majors in university, English teachers, and business professionals utilizing English in their work. Encompasses over 95% of the vocabulary in STEP Grade 1 and TOEIC.
Level 8	The ultimate objective for Japanese learners of English. Encompasses over 95% of words commonly used in English workplace contexts. Additionally, it covers more than 95% of words in STEP Grade 1 and TOEIC.

* The STEP, an English testing platform also known as EIKEN in Japan, assesses practical proficiency in the four English skills, with Grade 1 being the most challenging. It is comprised of seven grades and is currently one of the most extensively used English exams in Japan. STEP Grade 1 corresponds to levels B2 to C1 in the Common European Framework of Reference for Languages (CEFR).¹³

Table 2. Specifics for the Flesch Reading Ease Score Group

90–100	Very easy
80–89	Easy
70–79	Fairly easy
60–69	Standard
50–59	Fairly difficult
30–49	Difficult
0–29	Very confusing

Table 3. Comparison of Flesch Reading Ease Scores across STEP Exams, *The Japan Times*, and NEMP English questions

Source	Word Count	FRE
STEP Grade 2	1,091	60.0
English questions in NEMP	1,087	48.9
<i>The Japan Times</i>	1,097	41.5
STEP Grade Pre-1	1,099	33.6
STEP Grade 1	1,083	17.6

Table 6. Words not in the base dictionary (N/A)

Word Level	Words	Frequency	Word Level	Words	Frequency
N/A	tachycardia	6	N/A	soreness	1
N/A	crackle	5	N/A	conjunctival	1
N/A	hemiplegia	3	N/A	hyperemia	1
N/A	pleural	3	N/A	meningeal	1
N/A	quadrant	3	N/A	subarachnoid	1
N/A	nausea	3	N/A	perfringens	1
N/A	abdomen	3	N/A	enterococcus	1
N/A	wheeze	2	N/A	faecalis	1
N/A	bruit	2	N/A	influenzae	1
N/A	fibrillation	2	N/A	catarrhalis	1
N/A	atrioventricular	2	N/A	neurological	1
N/A	embolism	2	N/A	atrial	1
N/A	nystagmus	2	N/A	zoster	1
N/A	shortness	2	N/A	myocardial	1
N/A	effusion	2	N/A	infarction	1
N/A	endoscopy	2	N/A	mosquitoes	1
N/A	diarrhea	2	N/A	incubation	1
N/A	vaginal	2	N/A	extremity	1
N/A	appendectomy	2	N/A	sentinel	1
N/A	edema	2	N/A	neonatal	1
N/A	jaundice	2	N/A	inborn	1
N/A	hydrocortisone	2	N/A	palpitation	1
N/A	anorexia	2	N/A	echocardiography	1
N/A	ultrasonography	2	N/A	hypotensive	1
N/A	flank	2	N/A	arrhythmia	1
N/A	measles	2	N/A	sinus	1
N/A	rubella	1	N/A	lobectomy	1

Due to space constrains, only 54 out of 123 words are included in the table.

classified as “proper nouns (proprn),” a category not included in **Table 1**. The majority of these terms belong to the field of medical terminology. **Table 5** provides a sample of extracted words from “Levels 7 and 8”, while **Table 6** identifies “Words not in the base dictionary”. Additionally, **Table 7** presents words categorized under “proper nouns (proprn)”.

Due to space constrains, only 54 out of 123 words are included in the table.

Based on these results, it is likely that the technical terms listed in these tables may appear in future NEMP. However, it is not a certainty. The inclusion of specific terms depends on various factors, such as curriculum changes, test design decisions, and evolving educational standards. Therefore, while these terms are potential candidates, there is no guarantee they will be included in future NEMP questions.

4. Discussion

The results of the analysis suggest certain considerations for helping students prepare for English questions in the

NEMP. These questions are considered more challenging than passages typically encountered in STEP Grade 2, yet they fall slightly below the complexity level of articles found in English-language newspapers like *The Japan Times*, as indicated by the FRE scores. Hence, if one goal of medical English education is to enable students to handle the English questions on the NEMP, selecting textbooks with an FRE score around 48.9—corresponding roughly to CEFR levels B1 and B2 and reflecting the difficulty of NEMP questions—would be an effective strategy. Starting with general passages at the STEP Grade 2 level, which feature less medical content, and progressively advancing to more specialized materials found in English newspapers can be an effective approach for preparing for the English questions on the NEMP.

The word cloud analysis consistently highlights the presence of questions related to abdominal pain in the NEMP. Leveraging these keywords from the word cloud can effectively guide medical students in finding relevant articles on the internet for their study focus. For instance, using keywords such as “pain,” “abdominal,” “old,” “low,” “blood,”

Table 7. Words belonging to proper nouns (propn)

Word Level	Words	Frequency	Word Level	Words	Frequency
propn	ECG	4	propn	Moraxella	1
propn	CT	4	propn	Pseudomonas	1
propn	stridor	3	propn	aeruginosa	1
propn	Japan	3	propn	Murphy	1
propn	ventricular	3	propn	Rosenstein	1
propn	Blumberg	3	propn	Courvoisier	1
propn	herpes	2	propn	Grey	1
propn	varicella	2	propn	Turner	1
propn	Glasgow	2	propn	carotid	1
propn	GCS	2	propn	ABO	1
propn	MRI	2	propn	COPD	1
propn	supraventricular	2	propn	rhonchi	1
propn	Zika	2	propn	Hamman	1
propn	lymph	2	propn	pericarditis	1
propn	Crohn	2	propn	pneumothorax	1
propn	sigmoid	2	propn	pulmonary	1
propn	mumps	2	propn	UHC	1
propn	Barthel	1	propn	ODA	1
propn	BI	1	propn	IHR	1
propn	JCS	1	propn	ICD	1
propn	MMSE	1	propn	microcephaly	1
propn	MRA	1	propn	acyclovir	1
propn	migraine	1	propn	measles	1
propn	meningitis	1	propn	pertussis	1
propn	hemorrhage	1	propn	rubella	1
propn	clostridium	1	propn	syphilis	1
propn	haemophilus	1	propn	delta	1

Due to space constraints, only 54 out of 99 words are included in the table.

and “examination” will enable students to find an article on the internet titled “34-Year-Old Woman with Abdominal Pain and Blood-Streaked Diarrhea” from Mayo Clinic Proceedings¹⁶. This closely mirrors the content of the English questions in the NEMP. These articles can serve as valuable study materials for students preparing for NEMP.

Additionally, the results from the New Word Level Checker suggest that medical terminology is intermittently present at Word Level 7, while vocabulary categorized under “Word Level 8”, “N/A”, and “propn” is predominantly composed of medical terms. Hence, integrating the memorization of these medical terms and progressively immersing students in articles featuring escalating levels of medical vocabulary can be a strategically effective approach to preparing for the English questions.

5. Limitations

The study acknowledges the limitations of its analysis due to the relatively small number of English questions in

the NEMP. However, as more questions added in the future, further analysis may reveal more accurate trends in English questions. These findings could help inform and develop effective preparation strategies for medical students.

6. Conclusion

The analysis concludes that a practical approach to preparing for English questions on the NEMP involves engaging with English literature that matches the appropriate FRE readability levels and reflects question trends identified in the word cloud. Additionally, it is recommended to focus on memorizing medical terminology categorized as “Word Level 7 and 8” as well as “N/A” and “propn”.

Finally, I would like to offer some insights from a linguistic perspective. As mentioned earlier, while there is a growing need for increased English proficiency in medical education and research, it is also important to strike a balance by preserving and nurturing the Japanese language.

This is especially important given the global trend of language loss, often attributed to the dominance of English. The author suggests that Japanese teachers of English can play a crucial role in this balance by helping students understand medical concepts and terminology in both English and Japanese, thus preserving linguistic diversity while enhancing global competencies.

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Appendix 1

English questions featured in the 117th edition (February 2023)

D-52

52. A 35-year-old man complained of a sudden onset of severe headache. For the past two weeks, he woke up around 3:00 a.m. due to soreness behind the left eye. His pain continued for about an hour. Today, he visited the emergency department at 5:30 a.m.

His consciousness was clear, but he appeared restless. His body temperature was 36.4 °C. Pulse rate was 84/min. Blood pressure was 136/80 mmHg. Conjunctival hyperemia and tearing of the left eye were observed. There were no meningeal signs. MRI and MRA of the head showed no abnormalities.

What is the most likely diagnosis?

- a migraine
- b meningitis
- c brain tumor
- d cluster headache
- e subarachnoid hemorrhage

Appendix 2

The formula for FRE follows:

$$206.835 - 1.01 \left(\frac{\text{total words}}{\text{total sentences}} \right) - 84.6 \left(\frac{\text{total syllables}}{\text{total words}} \right)$$

Appendix 3

Question in which the word “abdominal” and “pain” is used. The question of the 113rd edition (February 2019)

B Question 34

A 25-year-old man comes to your clinic complaining of **abdominal pain** for the past two days. Yesterday, the **pain** was periodic and located around the periumbilical area. Today the **pain** is persistent and located in the right lower quadrant. He feels feverish. He does not smoke or drink alcohol. His body temperature is 37.7°C, blood pressure is 126/62 mmHg, and pulse rate is 94/min, regular.

B Question 34

Which of the following should be done next?

- a) perform a CRP test
- b) examine for peritoneal irritation
- c) administer a broad-spectrum antibiotic
- d) perform an abdominal CT with contrast
- e) perform an upper gastrointestinal endoscopy

Use of AI-integrated text-to-speech in history-taking lessons: A pilot study

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Abstract

This ongoing pilot study investigates the use of AI-integrated text-to-speech (TTS) technology to enhance medical students' history-taking skills and empathic communication. Over six 90-minute sessions, students created and role-played their own unique simulated patient profiles, integrating detailed medical and social histories. TTS technology provided realistic and adaptive doctor-patient dialogues, which students used as models for their own role-play interactions. Student feedback highlighted the authenticity of the AI-generated dialogues and their effectiveness in teaching. The findings suggest that TTS can offer a structured, culturally sensitive learning environment that overcomes limitations of other commonly used teaching materials employed to model doctor/patient interactions. By focusing on social history and communication skills, TTS technology represents a significant advancement in medical education, contributing to more effective and inclusive training for future healthcare professionals.

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Keywords AI-integrated text-to-speech, TTS, medical education, history-taking skills, empathic communication, patient-centered care

1. Introduction

The advent of AI is having a transformative effect on the landscape of medical education. Although relatively new and still evolving, AI-integrated text-to-speech technology can be a valuable tool for promoting critical skills, such as empathy, in teaching history-taking to medical students. Its use in structured dialogues aids in understanding common question formats, broadening vocabulary, and fostering the development of essential empathic communication skills needed in patient-centered medical practice.

2. Background and objective

This pilot study was introduced for a new second-year history-taking class comprising six 90-minute sessions

designed for small groups of approximately 16 students each. The primary objective was to provide history-taking instruction while promoting empathic communication skills critical for patient-centered practice. Physician empathy significantly enhances both patient satisfaction¹ and clinical outcomes.² However, linguistic and cultural differences between doctors and patients can create barriers to empathetic and effective care.³ Empathy in clinical settings is often conceptualized as a predominantly cognitive activity⁴ rather than an emotional response; however, for students to practice empathic communication effectively, they need to respond to detailed and coherent patient backgrounds that facilitate meaningful engagement.⁵

Traditional pedagogical methods often fall short in providing the necessary depth for students to empathically engage with the complexities that often characterize a patient's unique medical, social, and psychological situation. Although students are advised to "focus on the individual rather than symptoms," an absence of comprehensive patient medical and social history can render this guidance superficial. To address this issue, a novel approach was implemented where students were asked to create their own simulated patient (SP) profiles, each with a fully developed medical and social history. Students were given complete freedom to choose any medical complaint, age, gender, and nationality and develop a unique and detailed social and medical history. Students would role-play as these SPs in

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every lesson. The benefits of this approach are:

1. Providing a diverse pool of SPs for in-class history-taking practice.
2. The act of creating an SP helps students understand the interplay between medical and social histories.
3. When acting in the role of doctors, students can reference their own SP's history to help them identify pertinent areas of enquiry and form and articulate relevant questions.

The history-taking sessions employed a modular four-frame approach, offering a clear yet adaptable framework for students. Standardized patient notes forms were used to ensure consistency. However, a significant challenge was modeling effective doctor-patient dialogues for the students on which they could base their own simulated interactions. Given our very specific structural requirements, traditional resources, such as YouTube, provide limited options and are often less than reliable in terms of quality and accuracy.⁶ The option of creating bespoke audio-visual materials proved too costly and impractical within the given time constraints.

3. Realism and social history

In patient-centered medicine, acquiring a patient's social history is critical for understanding their overall health and well-being. Social history includes factors such as employment, family, living circumstances, habits, and cultural influences, which offer a holistic view critical for providing effective patient care and tailored treatment plans. Understanding these elements can reveal vital information, such as potential health hazards in a patient's behaviors, work environment, or familial support systems.⁷

AI-integrated text-to-speech technology provides a unique advantage by allowing educators to create diverse and detailed social histories tailored to different patient profiles, encompassing a wide range of social determinants that affect health. This adaptability equips students with the ability to elicit and comprehend important social history details, a skill indispensable for their future roles as "culturally competent" healthcare providers.⁸

4. Modeling doctor-patient history-taking conversations

For second-year medical students, TTS technology proves to be a powerful tool for creating relevant and engaging doctor-patient dialogues. In this pilot study, students were provided with a standardized patient notes form and then listened to nine-minute dialogues structured around four key frames: the patient's current complaints, past medical history, social and family history, and exploration of Ideas, Concerns, and Expectations (ICE). Students listened to these simulated dialogues, took clinical notes on each frame, and could replay the dialogue, as needed, to complete their notes.

They then reviewed a transcript to verify their notes and participated in role-playing the dialogue, using their notes and the transcript as needed. In the second half of the lesson, students practiced their own interactions both in the role of doctor and as patient, using their own SP profile.

By introducing students to a new patient in every lesson, this approach aims to foster what Halpern (2011) refers to as "engaged curiosity"⁹ by encouraging students to explore the patient's emotional perspectives and their own reactions.

5. Versatility and adaptability of AI-augmented text-to-speech

AI-augmented TTS technology allows for the creation of diverse and detailed patient scenarios tailored to specific learning objectives. This adaptability ensures that dialogues are accessible, engaging, and relevant to students' educational needs. Key features include:

- **Variety in Voice Options:** AI TTS provides a range of voices, including male, female, and non-binary options.
- **Age and Accent Diversity:** Offers different age groups (e.g., middle-aged, young adult, child) and a variety of global English accents.
- **Mood Variability:** Can simulate various moods such as conversational, cheerful, sad, calm, angry, etc.
- **Natural Speech Patterns:** Natural-sounding word stress, inflection, and cadence.
- **Playback Flexibility:** Instructors can adjust playback speed and troubleshoot inconsistent pronunciation.

TTS technology also allows for a standardized framework for dialogues, ensuring clarity and consistency in language. By organizing dialogues into distinct frames, the TTS system helps students become familiar with question forms and communication styles for a wide variety of doctor-patient interactions. This structured method supports the development of essential skills in history-taking and patient communication.

6. Student perceptions of AI-generated dialogues

Throughout the course, students were not informed about the method used to generate the dialogues. Consequently, their post-course survey feedback on the use of artificial speech in the language classroom was of particular interest. While the study is ongoing and has so far involved only two of the four second-year groups, the feedback collected thus far has been overwhelmingly positive. There was no discernible reaction indicating that students identified the dialogues as AI-generated. Terms like "native speakers" and "real-life" were commonly used in their descriptions, indicating that the AI-generated dialogues successfully simulated real-world interactions.

7. Conclusions

Integrating AI-integrated text-to-speech technology in medical education provides a comprehensive, structured, and culturally sensitive learning environment. This innovative educational approach addresses critical challenges in traditional teaching aids, providing a more adaptable and tailored resource for training in medical communication, particularly in history-taking and patient-centered care.

By creating doctor-patient dialogues around the four-frame history-taking methodology, text-to-speech technology offers a flexible, accessible, and engaging model for medical students. It facilitates the development of essential language and communication skills by creating a standardized, controlled, and comprehensible language environment. This framework enables a focused learning experience that is conducive to effective history-taking and empathic communication in clinical practice.

Moreover, this approach highlights the limitations of traditional teaching aids, particularly YouTube videos. The challenges related to audio quality, content relevance, and structural adherence underscore the need for a more adaptable educational resource. Text-to-speech technology emerges as a comprehensive solution, providing easily understood and adaptable dialogues that cater to diverse medical specialties and cultural contexts, ultimately promoting inclusivity and diversity in medical education.

The paper underscores the importance of social history in patient-centered medicine, emphasizing that comprehensive patient care extends beyond merely cataloging medical symptoms to include understanding the patient's broader social context. AI-integrated text-to-speech technology's flexibility in creating and presenting diverse medical and social history scenarios can significantly help future healthcare professionals develop the necessary skills to comprehend and elicit relevant social history, fundamental for offering more patient-centered and culturally competent care.

Despite some limitations, such as occasional unnatural

or inappropriate speech patterns, the benefits of using TTS technology far outweigh the drawbacks. As Voltaire observed, "perfection is the enemy of the good," and while TTS may not achieve perfect realism, it remains a valuable resource for creating structured and engaging learning materials. As AI technology continues to evolve, the applicability of text-to-speech in medical education will continue to offer a more comprehensive, inclusive, and culturally sensitive approach to training future healthcare professionals.



If you are interested and would like to hear one of the doctor/patient conversations we have been using, please use the QR code. I would be very interested to hear your thoughts and will be happy to answer any questions.

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Vocabulary variation in medical students' selection of research abstracts through the COVID-19 pandemic

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Abstract

This study was conducted as part of a needs analysis to identify which research abstracts should be added to the Medical English Education Support System (MEESUS) as little is known about which topics or vocabulary are more engaging for students. In this study, we examined fourth-year medical students' preferences for research abstracts from the vocabulary perspectives before, during, and after the COVID-19 pandemic. We collected abstracts chosen by fourth-year medical students for class assignments in the academic year before the COVID-19 outbreak (2018), during the pandemic (2021), and after the resumption of in-person classes (2023). The texts were compared to those published in the same peer-reviewed medical journal, specifically focusing on the use of vocabulary. The analysis suggests that students may tend to prefer topics or vocabulary related to recent pressing health issues, particularly those connected to their environment and experiences, such as COVID-19. In 2018, students selected abstracts that frequently included terms like "communities" and "azithromycin," indicating a focus on community health, especially treatments for regional children. In the 2021 remote class during the COVID-19 pandemic, students showed an interest in infectious diseases, reflected in keywords like "covid," as well as topics related to smoking and obesity. By 2023, the focus on COVID-19 persisted, along with growing interest in food allergies and cancer-related treatments. The mean coverage of The New General Service List (NGSL) within the students' abstracts in the 2021 and 2023 classes was significantly higher than in the reference abstracts (2021 class: $t = 4.2$, $df = 113$, $p < .01$; 2023 class: $t = 2.5$, $df = 145$, $p = .01$). The findings suggesting a shift towards more accessible language in the texts chosen by students during and after the COVID-19 pandemic are discussed.

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Keywords research article abstracts, medical English classroom, vocabulary, randomized controlled trials, COVID-19

1. Introduction

Vocabulary mastery is fundamental to academic comprehension.¹ Students often face obstacles in academic texts due to unfamiliar vocabulary or uncertainty about correct usage.² This issue is particularly significant in specialized disciplines like medicine.³ Guidelines have been established to help learners reach a proficient level

of English that aligns with global standards.⁴ According to these guidelines, the minimum requirements for vocabulary include the ability to search for information using English terms and expressions essential for research in medicine and health care.⁵ Students are also expected to develop skills for research article abstract reading. These standards aim to ensure students are equipped for academic and professional success.

Students often have difficulty understanding and retaining the complex terms introduced in medical education and practice.⁶ Shimizu found that Japanese medical students had difficulty understanding sentences in English abstracts, particularly those in the results section that present demographic characteristics of patients.⁷ Learning about such highly conventionalized communication requires using materials that engage students.⁸ In order to help learners become familiar with these terms, we have developed the bilingual concordance tool Medical English Education Support System (MEESUS).⁹ The system, based on the

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corpora of titles and abstracts from *The New England Journal of Medicine (NEJM)*'s original articles, displays concordance lines in response to an input of a search term. Our studies have suggested that the tool may help students become familiar with abstract texts.¹⁰⁻¹² To further enhance the system, prioritizing papers on topics of interest to students is an option. However, little is known about which topics students find interesting. As part of a needs analysis related to coursework, this study examined fourth-year medical students' preferences for research abstracts and how their preferences evolved before, during, and after the COVID-19 pandemic.

2. Methods

2.1 Objectives and research questions

This study aimed to investigate the preferences of medical students regarding research abstracts and how these preferences evolved over time. We addressed the following two research questions:

Research question 1: What kind of topics or vocabulary do the students prefer in abstracts?

Research question 2: How did students' preferences for the topics or vocabulary change across 2018, 2021, and 2023, especially in the context of the COVID-19 pandemic from December 2020 to May 2023?

By analyzing the thematic and lexical variations in the abstracts selected by students over these periods, we aimed to understand how global health crises affect the educational interests and needs of medical students.

2.2 Class management and evolution across different instructional formats

In this study, we focus on the English reading classes for fourth-year medical students conducted in 2018, 2021, and 2023. The class format and key issues are shown in **Table 1**. The class structure was basically the same for these years, with significant differences in the mode of delivery and materials used. In 2018, the class was held in-person and relied heavily on paper materials. In 2021, the class

transitioned to a remote format conducted on Zoom. By 2023, we returned to an in-person class but fully utilized electronic devices, including a learning management system (LMS) and digital tools like Microsoft Word for assignments.

In these classes, students received in-house comprehensive materials that described the framework of genre¹³ and move analysis.¹⁴ While the class materials and instructions were revised each year—with differences such as the use of Zoom for remote instruction during the COVID-19 pandemic—the overall structure remained similar (**Table 2**).

The class materials included explanations of the rhetorical functions of the Introduction, Methods, Results, and Conclusions of abstracts. This structure should have been familiar to students who had previously learned it in their first-year academic writing course. Additionally, terms specific to the research article genre, such as “author” and “structured abstract,” were explained. The materials also introduced the CONSORT guideline,¹⁵ along with an initiative called the EQUATOR Network, which aims to enhance the transparency and quality of medical research.¹⁶ Explanations of terms like “randomized controlled trial” were also provided. These explanations were presented in a fill-in-the-blank format so that students could engage actively in class activities.

The students read the model abstract. As a model, we used the abstract of the CHAMP trial¹⁷ in 2018 and 2021 and that of the ELDERCARE-AF trial¹⁸ in 2023. From the model abstract, the students were asked to extract information, such as trial design, participants, intervention, and outcome, in English with reference to the CONSORT guidelines. Having practiced reading and extracting information from the model abstract, each student was asked to choose a randomized controlled trial (RCT) article of interest to them. The primary difference across the years was the method of selection: in 2018 and 2023, students accessed the English or regional site of the *NEJM* in Japan, while in 2021, they used the MEEUS tool to make their selection.¹¹ Starting in 2021, whether or not the individual students chose RCT abstracts was checked by the instructor during the class before the students proceeded with the tasks of reading and extracting information such as trial design, participants, intervention, primary outcome, and number of participants randomized to each group (number randomized).

The approach to completing the tasks varied across the years. In the 2018 in-person class, before the outbreak of COVID-19, students completed the task on paper as a

Table 1. Class formats and COVID-19 impact across years

Year	Class format	COVID-19 issues
2018	In-person	None
2021	Online (Zoom)	Pandemic began to spread in December 2020
2023	In-person	Transition to Category 5 occurred in Japan

Table 2. Class formats and tools used for completing tasks including selection of RCT abstracts (2018, 2021, 2023)

Year	Class format	Homework format	Tools used
2018	In-person	After class (using internet)	Printed worksheet
2021	Online (Zoom)	During and after class (using internet)	Electronic worksheet on LMS
2023	In-person	During class (using internet)	Electronic worksheet in MS Word for submission to LMS

homework assignment. In the 2021 remote class, once it was confirmed that students had selected an RCT article, they were allowed to leave the class Zoom session to work on the task. The students then submitted their assignment through the class LMS.¹¹ In the 2023 in-person class, students brought their devices to class, completed the task in an MS Word file, and submitted it via the LMS. While we were unable to monitor how students approached the task in 2018 and 2021, the in-class setting in 2023 allowed the instructor to observe the interactive engagement. The students discussed the task with their peers and sought clarification from the instructor as they worked on it.

2.3 Data

The abstract texts selected by the students were used for analysis. The texts included in our examination were those obtained from students who provided informed consent to participate in the study and those available at the time of analysis. The number of eligible abstracts was 35 for the 2018 class, 96 for the 2021 class, and 110 for the 2023 class. The lower text count for the 2018 class was mainly due to the assignments being completed on paper, with only one class's assignments retained by the time of this study.

The students' choices of article titles were recorded on their individual assignment worksheets on paper for the 2018 class, in the LMS worksheet areas for the 2021 class, and on the MS Word worksheets for the 2023 class. Therefore, for the 2018 class, we carefully transcribed the titles from the students' handwritten submissions, searched the website to identify the abstracts, and obtained the texts. For the 2021 and 2023 classes, we extracted the students' submissions from the LMS and MS Word worksheets, respectively, and similarly obtained the abstract texts from the website.

As reference data, we used the abstracts of RCTs extracted from seven years of abstracts published in the *NEJM* that were implemented in MEESUS (2010, and 2015 through 2020). The lack of abstracts from certain years, specifically 2011 through 2014, was due to these texts not having been processed, primarily because of limitations in project resources.¹⁰ For the extraction of the reference data, we utilized the machine learning classification technique. First, we manually classified the 2010 abstract texts into RCT and non-RCT categories. We then used this data to train a machine learning model. The remaining abstracts, published in 2015 through 2020, were classified using the trained model. The classifications made by the machine learning model were reviewed and finalized by experts in both language and medicine (Table 3).

2.4 Keyword analysis

Using the corpus analysis tool, we conducted a keyword analysis of the student-selected RCT abstracts by year. Keywords are defined as words that "occur with unusual

Table 3. Number of Randomized Controlled Trial (RCT) abstracts and non RCT abstracts classified for each year (2010, 2015–2020) and percent agreement with manual classification

Year	2010	2015	2016	2017	2018	2019	2020	Total
RCT	116	145	123	131	143	157	140	955
Non RCT	92	78	85	77	65	52	77	526
Total	208	223	208	208	208	209	217	1481
% agreement	--	86.1	86.1	88.0	90.4	88.0	85.3	--

frequency in the given text [...] by comparison with a reference corpus of some kind,"¹⁹ with the log-likelihood keyness measure commonly employed for this type of analysis. For example, Anthony illustrates that when the Japanese English learner essay corpus was compared with a corpus of 1.3 million words of learner English from ten countries of Asia, "I" and "think" were the highest-ranking keywords, suggesting that Japanese learners use the expression "I think" more frequently in their writing than other Asian students.²⁰ In the context of materials design in ESP, Gilmore and Millar employed keyword analysis on a civil engineering research article corpus and extracted keywords such as "et al", "fig", and "model".²¹ By analyzing the keywords in the target corpus, we can identify and focus on the words that are distinctive to that corpus.

2.5 The analysis of vocabulary levels

For the vocabulary analysis of the student-selected RCT abstracts, the coverage of the New General Service List (NGSL) was examined. This list, created by Browne and his colleagues in 2013,²² is a modern update of West's 1953 General Service List.²³ It was developed based on a much larger corpus, with a clear definition of what constitutes a "word", and it provides significantly better coverage of general English texts. The higher coverage of this list suggests that the text contains a substantial number of basic, high-frequency words. Conversely, lower coverage would imply that the text contains a greater number of off-list words, which are often low-frequency and highly specialized terms.

2.6 Tools

The identification of the most frequently occurring words and keywords was performed using AntConc (Version 4.2.4).²⁴ Word counts in abstracts selected by the students and those in the reference texts were quantified using the corpus tool CasualConc (Version 3.0.6).²⁵ CasualConc was also used to examine the coverage of the NGSL in the texts selected by the students and the reference texts. The machine learning classification was performed using Python (Version 3.10.12) on Google Colaboratory to identify RCT abstracts for the reference texts.

3. Results

3.1 Identification of keywords in students' abstracts compared to reference abstracts

The identification of keywords that were unusually frequent in the students' selected abstracts compared to the reference texts showed that the students' abstracts contain vocabulary that characterizes the specific studies or topics of the selected abstracts (Table 4).

For instance, in 2018, the most prominent keyword, "communities," was associated with texts such as articles related to community health and azithromycin use in African countries.²⁶ In this context, 12 out of 35 students (34.3%) selected a study involving the following statement:

"Among postneonatal, preschool children in sub-Saharan Africa, childhood mortality was lower in communities randomly assigned to mass distribution of azithromycin than in those assigned to placebo, with the largest effect seen in Niger."

Additionally, eight students (22.9%) selected an article related to Alzheimer's disease, while others chose topics relevant to their environment, such as two students selecting an article on asthma and another two on gastric cancer prevention. Only two students (5.7%) chose articles related to infectious diseases, specifically those discussing the Rotavirus vaccine.

In 2021, keywords like "zMapp," which stands for "the triple monoclonal antibody," and "REGN" and "EB," representing "the triple monoclonal antibody REGN-EB3" were related to Ebola virus disease therapeutics. Among the 63 different articles chosen by students, 11 out of 96 students (11.5%) selected papers related to infectious diseases, including Ebola, influenza, and COVID-19. Following this, 9 students (9.4%) each chose articles related to smoking and obesity. The articles on smoking were identified by keywords such as "cigarettes" and "nicotine," while those on obesity were linked to keywords including "lorcaserin," "pentoxifylline," "thymectomy," and "lidocaine." Four students chose articles on alcoholic hepatitis, as indicated by the keyword "prednisolone," which

typically appeared in statements such as: "Prednisolone and pentoxifylline are both recommended for the treatment of severe alcoholic hepatitis." This pattern suggests a raised interest in topics related to health concerns, particularly infectious diseases, which were quite familiar to students during the COVID-19 pandemic.

Similarly, as indicated by keywords like "covid" and "furoate," which refers to fluticasone furoate used in the treatment of COVID-19, 21 of the 110 students (19.1%) chose articles on COVID-19 in the 2023 class. When including the two students who selected articles on other infectious diseases such as influenza and Ebola, more than 20% of the students chose articles related to infectious diseases. As reflected in a group of keywords "peanut," "epicutaneous," "patch," and "allergy," 15 students (13.6%) selected articles concerning peanut allergens. For example, one of the texts included the following statement:

"No approved treatment for peanut allergy exists for children younger than 4 years of age, and the efficacy and safety of epicutaneous immunotherapy with a peanut patch in toddlers with peanut allergy are unknown."

However, there was a major difference from the 2021 class in keywords such as "lymphadenectomy," "ferric," and "carboxymaltose" that appeared in 2023. These terms were associated with articles on gastric cancer. Seven students (6.4%) selected articles related to gastric cancer. While no students chose gastric cancer-related articles in 2021, two students did so in 2018.

These findings suggest a shifting interest among students. There was an increased interest in infectious diseases, possibly influenced by the ongoing global concerns surrounding COVID-19, as well as a growing awareness of their individual health concerns. Additionally, the choice of articles may reflect topics they were studying in their disciplinary courses.

3.2 The New General Service List (NGSL) coverage

The mean coverage of the NGSL within the students'

Table 4. Top 10 keywords in the students' abstracts compared to reference data

2018 class			2021 class			2023 class		
Rank	Type	Keyness*	Rank	Type	Keyness*	Rank	Type	Keyness*
1	communities	446.0	1	cigarettes	291.4	1	peanut	543.4
2	niger	331.5	2	nicotine	250.9	2	placebo	349.9
3	tanzania	281.9	3	prednisolone	160.6	3	covid	326.6
4	azithromycin	267.3	4	lorcaserin	158.2	4	furoate	193.1
5	verubecestat	256.9	5	pentoxifylline	149.3	5	epicutaneous	188.3
5	malawi	256.9	6	zmapp	146.9	5	patch	188.3
7	alzheimer	223.1	7	regn	144.4	7	lymphadenectomy	174.1
8	mortality	204.4	7	eb	144.4	8	ferric	161.4
9	yearly	186.2	9	thymectomy	119.4	8	carboxymaltose	161.4
10	mass	183.2	10	lidocaine	116.8	10	allergy	145.1

*Log likelihood ratio value

abstracts was 73.7% for the 2018 class, 76.9% for the 2021 class, and 75.8% for the 2023 class, while the wordlist covered 74.8% of the terms in the reference texts (Figure 1). The coverage in the students' abstracts in the 2021 and 2023 classes was significantly higher than that of the reference abstracts (2021 class: $t = 4.2, df = 113, p < .01$; 2023 class: $t = 2.5, df = 145, p = .01$). These results suggest a potential shift towards more accessible language in the texts chosen by students during and after the COVID-19 pandemic.

3.3 Other features of students' abstracts

3.3.1 Word count

The students did not appear to prefer shorter abstracts. The mean word counts of the abstracts were 360, 324, and 325 words, respectively for the 2018, 2021, and 2023 classes and was 315 words for the reference texts (Figure 2). These findings indicate no significant bias towards abstracts with fewer words.

3.3.2 Most frequently occurring words

The most frequently occurring words in the students' abstracts were similar to those in the reference abstracts (Table 5). Common function words such as "the," "of," and "in," consistently appeared across all texts, with these three words present in every abstract. However, content-specific

words showed some variation. For instance, the occurrence of "patients" was noted in the 2021 class and reference abstracts. The term "placebo" appeared in the top 10 most frequently occurring words in 2018 and 2023 and was ranked 14th in 2021. These variations could be attributed to the repeated occurrence of specific vocabulary in abstracts chosen by the students or the influence of the model abstracts they read. Overall, while there was substantial overlap between student-selected and reference abstracts in terms of high-frequency words, slight differences suggest that student selections may reflect shifting focus areas or interests across different years, particularly during the COVID-19 pandemic.

4. Discussion and conclusions

The analysis in this study suggests that the students may have tended to prefer topics or vocabulary related to recent pressing health issues. The abstracts they chose often showed topics related to their environment and experiences such as COVID-19. In the 2018 in-person class setting, the abstracts selected by students frequently included terms such as "communities" and "azithromycin," which were likely related to community health. The abstracts from only one class were available that year, and many students chose the

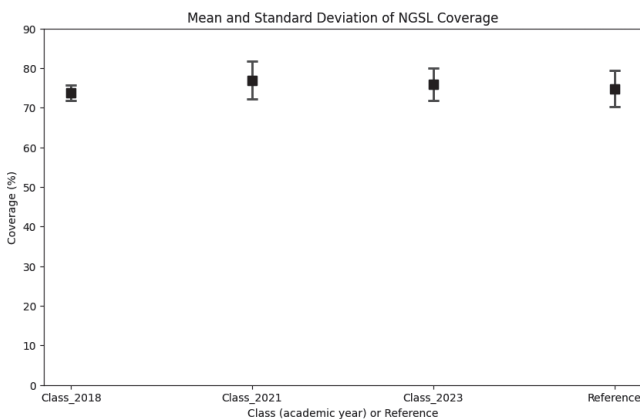


Figure 1. The NGSL coverage within the class and reference abstracts.

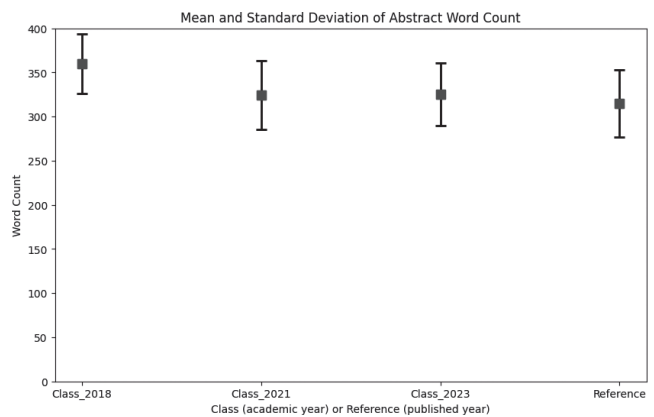


Figure 2. Word count of the class and reference abstracts.

Table 5. Top 10 most frequent words (types) across the abstracts

Rank	2018 class			2021 class			2023 class			Reference		
	Type	Freq.	Range	Type	Freq.	Range	Type	Freq.	Range	Type	Freq.	Range
1	the	70,685	100.0%	the	60,158	100.0%	the	61,092	100.0%	the	56,800	100.0%
2	in	52,260	100.0%	of	43,383	100.0%	in	49,181	100.0%	of	42,285	100.0%
3	of	40,505	100.0%	in	35,157	100.0%	of	40,206	100.0%	in	37,676	100.0%
4	and	29,783	100.0%	and	28,087	100.0%	to	27,205	100.0%	and	26,773	99.9%
5	to	28,433	100.0%	to	26,191	100.0%	and	26,254	100.0%	to	24,455	100.0%
6	group	22,159	97.1%	with	19,603	100.0%	group	20,075	92.7%	with	20,641	98.5%
7	placebo	20,332	100.0%	group	17,996	81.2%	a	19,348	100.0%	a	18,299	99.1%
8	was	16,123	100.0%	a	17,900	99.0%	with	18,789	99.1%	group	16,985	87.5%
9	with	14,614	100.0%	patients	14,525	76.0%	placebo	18,509	85.5%	patients	16,353	79.0%
10	mg	13,819	80.0%	was	13,626	94.8%	or	15,434	100.0%	was	13,975	98.8%

Freq: Frequency per million words

same abstract. This suggests they might have selected the same one to share their work with each other. However, the presence of geographic names such as “Tanzania” and “Niger” among the keywords may reflect their interest in global health issues and medical interventions in these areas. In the 2021 remote class, during the COVID-19 pandemic, students tended to show an interest in infectious diseases, as reflected in keywords like “covid,” along with topics related to smoking and obesity. By 2023, this trend continued with a strong focus on COVID-19, as well as a growing interest in food allergies and cancer-related treatments. There are arguments that keyness measures should be supplemented with a more reliable effect size metric to better rank words.²⁰ It has also been pointed out that a keyword may sometimes be derived from only a small number of files within a corpus.²⁷ However, the findings of the present study indicate that students may prefer abstracts that address the most recent health challenges, with a particular focus on infectious diseases and conditions relevant to their personal health concerns.

The mean coverage of the NGSL within the students’ abstracts was 73.7% for the 2018 class, 76.9% for the 2021 class, and 75.8% for the 2023 class, while the wordlist covered 74.8% of the terms in the reference texts (**Figure 1**). The coverage in the students’ abstracts in the 2021 and 2023 classes was significantly higher than that of the reference abstracts (2021 class: $t = 4.2$, $df = 113$, $p < .01$; 2023 class: $t = 2.5$, $df = 145$, $p = .01$). While the significant difference observed may be attributed to the large sample size of the reference abstracts, these results also suggest a potential shift towards more accessible language in the texts chosen by students during and after the COVID-19 pandemic.

This study was conducted as part of a needs analysis to identify which research abstracts should be added to MEESUS⁹ to better align with student interests. To enhance the system’s effectiveness, we aimed to prioritize papers on topics that potentially invite students’ interest. In our fourth-year reading classes, we place an emphasis on becoming familiar with RCT abstracts because they are considered a pivotal type of study in medical research. Millar, Salager-Meyer, and Budgell describe RCTs as being widely recognized as the highest standard in research and can significantly impact health care practices and policies.²⁸ Although further examination is needed to fully ascertain pedagogical needs, integrating abstracts that are relevant, accessible, and engaging for students could be a good option for improving their learning outcomes.

Declaration of competing interests

We declare that we have no competing interests.

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English questions in the Japanese National Medical Licensing Examination: An English teacher's perspective

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Abstract

English questions are now an established feature of the Japanese National Medical Licensing Examination (NMLE). The author examined the characteristics of English questions in the NMLE, with a view to identifying problems and offering suggestions for improvement. English questions appearing in the NMLE 2009-2024 were examined for patterns in question type, linguistic style, grammatical accuracy, and the level of difficulty. It was found that basic grammatical errors are not uncommon, and that questions sometimes feature unnatural expressions unlikely to be used by a native-speaker medical professional. It was also noted that questions can sometimes be answered correctly with little or no specialist medical knowledge, or with only a limited understanding of the English text. The findings suggest that questions could be improved by soliciting input from English language teaching professionals and native-speaker medical professionals, although the secrecy surrounding the exam may make this proposal difficult to implement. The findings also point to a possible future role for AI in creating or checking questions, although this does not appear to be practicable or desirable at the present time.

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Keywords National Medical Licensing Examination, medical English, artificial intelligence, ChatGPT

1. Introduction

English is a required subject that features prominently in the medical curriculum, and few would deny that English communication skills are essential for Japanese doctors in this global age. However, before 2009 there were no English questions on the Japanese National Medical Licensing Examination (NMLE), the final hurdle that must be cleared to qualify as a doctor in Japan. Perhaps reflecting this, a study at the turn of the century found that at that time most medical schools were not even offering courses specifically in medical English.¹ Although the number of English questions remains very small (roughly 1% of the total), it is reasonable to assume that their inclusion has helped raise the profile of

medical English in the medical curriculum, at least to some extent. However, English courses typically appear in the early years of medical school, long before students turn their attention to the NMLE, and my own informal conversations with English teachers at medical schools suggest that there are still many who have never actually seen an English question from the NMLE, or who are not even aware that they exist. Moreover, the high-stakes nature of the NMLE almost certainly requires that advance knowledge of questions be limited to an inner circle of people directly involved in its construction. Some JASMEE members have worked to draw teachers' attention to English questions in the NMLE, for example through presentations, papers, or shared materials.²⁻⁴ This author has also written on the subject.⁵ However, it is an area deserving of further attention, and it is hoped that this paper, and the presentation on which it is based, can help to raise awareness of the types of English questions that have appeared in the NMLE to date, and draw attention to some recurring problems with them, as seen from the perspective of an English language teacher.

2. Methods

All past NMLE questions are available for download from the website of the Japanese Ministry of Health, Labor and

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Welfare (<https://www.mhlw.go.jp>). However, the English questions can also be tracked down on numerous blogs and websites. My own primary source was a PowerPoint file shared on the JASMEE website, in a format intended to facilitate easy classroom use.⁴ There is no guarantee that the 34 questions in this source account for every single NMLE question that could reasonably be categorized as an *English question* (a surprisingly difficult concept to pin down, given the number of questions that contain a mix of English and Japanese). However, it seems reasonable to assume that it offers a fair and accurate reflection of the nature of English questions in the exam.

The author sought to answer the following questions:

1. What different question types can be categorized as *English questions*?
2. Is the English in the questions consistently accurate?
3. Is the English consistently natural, reflecting the way native-speaker doctors are likely to express themselves?
4. Do the questions pose a suitable challenge in terms of (1) the medical knowledge required and (2) the English ability required to answer them correctly?

The analysis was purely qualitative. The aim was to identify recurring issues and areas of concern, not to test a hypothesis or describe the questions in statistical terms, and hence no statistical analysis was conducted.

3. Results and discussion

3.1. English question types in the NMLE

The English questions in the NMLE come in various forms. Questions sometimes contain an unusual mix of Japanese and English, that does not seem to mirror any real-world scenario in which the English is likely to be encountered, e.g.:

疾患と聴診所見の組合せて正しいのはどれか。

- | | | |
|---------|---|-----------------|
| a COPD | — | stridor |
| b 胸膜炎 | — | rhonchi |
| c 石綿肺 | — | fine crackles |
| d 肺水腫 | — | Hamman's crunch |
| e 気管支喘息 | — | friction rub |
- (NMLE 116-E15)

Other questions combine English and Japanese in a manner that a Japanese doctor working in Japan might typically be faced with, such as a case of a patient presenting a letter of referral written at an international airport en route to Japan (**Appendix 1**). However, recent years have seen an increase in all-English questions, in which a text, question, and five answer choices are all in English (**Appendix 2**).

While this trend may lead to an increase in the raw word count of English in the NMLE, at present there is no sign of a significant increase the relative weight of English questions,

which have yet to number more than four or five out of a total of 400 or more questions. This may be one reason why problems and blatant errors that should not appear in such a high-stakes exam in fact seem to slip quietly under the radar.

3.2 Grammatical accuracy

The analysis uncovered the following eight clear errors with articles, prepositions, and verb tenses, and number (2) also contains an additional vocabulary error. Suggested corrections are given in parentheses.

- (1) "A 35-year-old man complained of a sudden onset of severe headache." (117-D52)
(→ ...of sudden onset...)
- (2) "The infection during pregnancy can cause microcephaly of the new born." (115-A6)
(→ Infection during pregnancy can cause microcephaly of the newborn.)
- (3) "...there is a small but certain possibility that she falls into a state of adrenal failure (111-H24)
(→ ...that she will fall/ may fall...)
- (4) "Icterus on his conjunctiva, several vascular spiders in his anterior chest and bilateral pretibial edema were observed." (110-C20)
(→ ... on his anterior chest...)
- (5) "Moderate amount of ascites was detected by ultrasonography." (110-C20)
(→ ... A moderate amount...)
- (6) "He has never been treated on alcoholic problems."
(→ ...for alcohol-related problems)
- (7) "Distended abdomen has been developed in these two days." (110-C20)
(→ He developed a distended abdomen over the last 2 days.)
- (8) "He had appendectomy when he was 8 years old." (109-F25)
(→ ...had an appendectomy...)

Even though four of the above examples are from the same question, it is still disturbing that 5 of the 34 questions examined contained one or more such basic errors.

3.3 Linguistic style

3.3.1 Awkward phrasing and superfluous words

English medical journals typically encourage doctors to express themselves clearly and succinctly. However, at present the NMLE is a poor role model for this. Questions often include sentences that, although grammatically correct, are awkwardly phrased and/or contain superfluous words. Examples follow, with suggested improvements in parentheses.

- (1) "Which of the following clinical conditions occurs in patients acutely after severe burns?" (118-B13)
(→ Which of the following occurs rapidly after [sustaining] severe burns?)
- (2) "Which is the most likely personal information that

can be used to identify an individual person?" (116-C23)

(→ Which of the following is the most useful information for personal identification?")

- (3) "A 21-year-old previously healthy man presented to the emergency room with chest pain, which was worse on breathing lasting for two days." (116-E38)

(→ ...presented to the emergency room with a two-day history of chest pain that was aggravated by deep breathing.)

- (4) "He lived alone and drank alcohol every day. The amount of his alcohol intake was over 60g/day. (115-B32)

(→ He lived alone and drank over 60g of alcohol per day.)

- (5) "A 65-year-old woman was diagnosed with stage IB right lung cancer. She underwent right lower lobectomy with lymph node dissection for the cancer." (114-D63)

(→ She underwent right lower lobectomy with lymph node dissection [~~for the cancer~~.])

3.3.2 Non-nativelike expressions

While fewer in number, there are also cases of language that may appear acceptable to the layman, but is simply not normal in medical discourse. Three examples follow, with suggested improvements in parentheses.

- (1) "At presentation, she was slightly hypotensive with a blood pressure of 96/68 mmHg." (114-A31)

(→ At presentation, blood pressure was 96/68 mmHg.)

- (2) "On physical examination, consciousness level was GCS E4V4M6" (116-A61)

(→ ..., GCS score was E4V4M6.)

- (3) "His consciousness was clear, ..." (117-D52)

(→ He was alert and oriented,...)

There are two distinct problems with text (1), the first of which has previously been pointed out by Saito.³ Namely, doctors know how to interpret blood pressure readings, and so would not need to be told, or appreciate being told, that this patient "was slightly hypotensive." This is roughly akin to an English teacher who knows full well how to interpret IELTS band scores being told, "The student scored 4.0, which is a low score." Second, the description *slightly hypotensive* does not even seem to be correct, considering that the clinical definition of hypotension is a blood pressure reading below 90/60.

As for (2) and (3), these are simply not expressions that a native-speaker clinician is likely to use.

3.4 Level of difficulty

The *medu4* website (<https://medu4.com>) reports correct answer rates for English questions typically exceeding 90%, and as high as 99%. Conversely, correct answer rates below

80% appear to be rare. I suspect that this high success rate is less a reflection of a very high level of English reading ability among test takers, and more an indication that the medical content of the questions is often very simple, and that many questions can easily be answered without a full understanding of the English text. The following question from the most recent exam is a case in point:

An ambulance brought a 28-year-old man to the emergency room. He was found on the street unconscious. In his wallet, he had a memo stating, "I have thrombocytopenia from aplastic anemia. If I pass out, please obtain a CT scan to rule out intracranial hemorrhage immediately. Thank you in advance."

Which test should you order next?

- a) head CT
 - b) brain MRI
 - c) serum alcohol level
 - d) serum ammonia level
 - e) Electroencephalogram
- (118E-28)

At first glance this may look like a challenging question, full of technical vocabulary. However, the mention of "please obtain a CT scan" in the text is by itself probably enough to point most test takers to choose "a)", the correct answer. Moreover, it would probably be enough to enable someone who has never studied medicine, but who understands basic English grammar, to answer correctly. The leads us to wonder what exactly this question is supposed to be testing. The inclusion of several specialist medical terms creates the illusion that it is testing the ability to read and understand a medical text, but test takers who do not understand *thrombocytopenia*, *aplastic anemia*, or *intracranial hemorrhage*, and who would be unable to summarize the text in their own words, should still be able to answer correctly. However, *Medu 4* reports that 88% of test takers answered this question correctly, which seems lower than expected. So, what about the other 12%? Was their English reading ability so limited that they couldn't even make the connection between "obtain a CT scan" and "head CT"? Or could it be that some of them actually understood the text perfectly well, but suspected that "head CT" was a red herring, as it seemed simply too obvious to be the correct answer? A chain of thought like the following would not be unreasonable: "Who wrote this memo? Why should I order a head CT just because this memo asks for one? It's up to me to assess the situation and decide the correct course of action. An MRI would provide a clearer picture, even though it would take longer. Or maybe this young man has just passed out after drinking too much, as is not uncommon in men in their twenties? A serum alcohol test could quickly confirm or rule out that, so maybe I should do that first?"

In this way, it is entirely possible that a full understanding of the English text could actually make a test taker *less* likely to choose the correct answer. This is a pity, as a slight modification of the text, or a different set of answer choices, could have ensured that a clear understanding of the text is a necessary and sufficient condition to identify the correct answer. For example, the reference to “CT scan” could be removed from the text, i.e.:

A 28-year-old man was brought to the emergency room after being found unconscious on the street. A memo in his wallet states that he has thrombocytopenia due to aplastic anemia, and should immediately be investigated for intracranial hemorrhage if he passes out.

With this simple change, the text no longer contains any words included in the answer options, and it is no longer possible to answer correctly without understanding the key points in the scenario.

Alternatively, we could keep the original text, but change the question and the answer options as follows:

Which test should you order first?

- a) head CT
- b) neck CT
- c) chest CT
- d) abdominal CT
- e) pelvic CT

In this case, it is necessary to at least understand *intracranial hemorrhage* in order to answer correctly.

3.5 A role for language teachers and native-speaker doctors?

At present there are clearly many problems with the content of English questions in the NMLE. However, most are problems that an expert English teacher, especially one skilled in medical English, could very easily identify and correct. If it were possible to include such an expert on the committee that decides the questions, most problems would vanish. Likewise, if a native-speaker doctor were asked for input, expressions unlikely to be used in medical discourse in an English-speaking country could soon be identified. Indeed, my own research for this paper/presentation involved showing the past questions to a native-speaker doctor, who was quickly and easily able to identify the problems discussed above, including the fact that “head CT” may not be such an obvious answer after all. Whether including such people on the committee has not been considered or deemed necessary, or whether rules and security measures make this difficult to implement at present, remains unclear. However, the need for such voices is very clear.

3.6 A role for AI?

In keeping with the JASMEE 2024 conference theme of *Medical English Education in the AI Era*, we might also wonder whether AI has already reached the point where it could reliably detect and correct the errors discussed above. Taking question 110-C20, several problems with which were identified in section 3.2, I decided to find out by giving ChatGPT the following prompt:

“The following is a medical English text used in the Japanese National Medical Licensing Exam. Correct any errors in the English. If necessary, change the language to make it more appropriate for a case report written by a doctor. Here is the text: The patient is a 61-year-old man with a complaint of general malaise. Distended abdomen has been developed in these two days. He has a long history of drinking. However, he has never been treated on alcoholic problems. On physical examination, his consciousness was clear. He had no fever. Icterus on his conjunctiva, several vascular spiders in his anterior chest and bilateral pretibial edema were observed. Moderate amount of ascites was detected by ultrasonography. Therefore, I strongly recommended him to consult a physician in his home country as soon as possible.”

ChatGPT replied as follows:

“The patient is a 61-year-old man presenting with complaints of general malaise. He reports developing a distended abdomen over the past two days and has a prolonged history of alcohol consumption, although he has never sought treatment for alcohol-related issues. During the physical examination, the patient’s consciousness was intact, and he did not exhibit any signs of fever. Examination of his conjunctiva revealed icterus, while several vascular spiders were noted on his anterior chest. Additionally, bilateral pretibial edema was observed. Ultrasonography revealed a moderate amount of ascites. Based on these findings, I strongly advised the patient to promptly seek consultation with a physician in his home country.”

Although ChatGPT identified and offered suitable corrections for the errors in “distended abdomen has been developed” and “alcoholic problems,” and made other changes that can be considered improvements, some of the changes seem problematic, e.g.:

- *a complaint of general malaise* has been changed to *complaints of general malaise*, which is simply wrong.
- In some cases changes seem to have been made for no obvious reason. For example, there is no particular reason why *consult* should be changed to *seek consultation with*.
- *He has never been treated* has been changed to *he*

has never sought treatment. This change is not only unnecessary, but also changes the meaning of the text: *seeking* treatment and actually *being* treated are not the same thing.

I pursued this last point with ChatGPT, as follows:

Prompt: *You rephrased "has never been treated" as "has never sought treatment". Is this acceptable?*

ChatGPT: *Yes, "has never sought treatment" is an acceptable rephrasing of "has never been treated" in this context. It conveys the same meaning that the patient has not actively pursued medical intervention or assistance for their alcohol-related issues.*

Prompt: *It could be that the patient sought treatment, but the doctor thought treatment was unnecessary. I'm not convinced by your logic.*

ChatGPT: *You're correct; my apologies for the oversight. "Has never sought treatment" may imply that the patient actively chose not to seek treatment, which might not accurately reflect the situation. A more appropriate rephrasing could be "has never received treatment," which doesn't imply whether the patient sought treatment or not, leaving room for the possibility that treatment was not recommended or pursued by healthcare providers. Thank you for pointing that out! ChatGPT can make mistakes. Consider checking important information.* Top of Form

Consider checking important information! Clearly then, while ChatGPT is a useful resource, it cannot yet be trusted to serve as the sole arbiter of correct English in NMLE questions, even if it could be used without compromising the security surrounding the questions.

4. Conclusion

Although English questions are now an established feature of the NMLE, there is clearly room for improvement in their quality. As has been noted, having the questions checked by at least one expert English teacher and at least one native-speaker doctor should be enough to ensure a clear improvement in quality. If, as seems likely, the number of English questions in the NMLE increases in the future, quality control will become even more important, and a failure to include such experts in the question-making process would likely result in the number of errors slipping through the net also increasing. However, it is also entirely possible that by that time AI will have advanced to the point where it can be relied upon not only to check questions for errors, but to actually make the questions. While this raises both practical and ethical concerns at present, and the timeline is difficult to predict, it seems almost inevitable that the creation of exams of all types is one of many areas where AI will encroach and eventually take over most of the duties

that are currently performed by human beings.

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Appendix 1. NMLE question including both English and Japanese (NMLE 109-F25)

44歳の男性。航空会社の職員に付き添われて空港内の診療所を受診した。持参した英文紹介状の一部を示す。

This patient is a 44-year-old man with a complaint of right flank pain*. The pain suddenly occurred while he was on the airplane. It was colicky and radiated to the right inguinal region. Neither nausea nor diarrhea was associated. He had appendectomy when he was 8 years old.

Urinalysis results: Protein(-), Sugar(-), Occult blood(2+)

*flank pain: lateral abdominal pain

出張のため近隣国へ向かう飛行機内で上記の症状を認めため、到着直後に現地の空港内の診療所を受診し鎮痛薬を投与された。疼痛は我慢できる程度になり、予定を変更して次の便で日本に帰国した。現在、紹介状に書かれた症状は我慢できる程度に続いており、新たに生じた症状はない。意識は清明。身長 165 cm, 体重 68 kg。体温 37.1 °C。脈拍 76/分、整。血圧 136/76 mmHg。

この患者にみられる可能性の高い身体診察所見はどれか。

- a) 腸雑音亢進
- b) 陰嚢の透光性
- c) 腹部血管雑音
- d) Blumberg 徴候
- e) 肋骨脊柱角の叩打痛

Appendix 2. Example of an all-English NMLE question (NMLE 118-A50)

An 85-year-old woman was admitted to the hospital with a left femoral neck fracture and was confined to bed rest. On admission, muscle strength and sensation in the left lower limb were normal, but the next day, she was unable to move her left foot upwards. On examination, she was

unable to dorsiflex her left ankle, with decreased sensation on the dorsal aspect of her left foot. The left lower limb was externally rotated.

Select the most likely cause of her decreased ankle movement.

- a) Cerebral infarction
- b) Lumbar disc herniation
- c) Peroneal <Fibular> nerve palsy
- d) Deep vein thrombosis
- e) Achilles tendon rupture

How do listening scores change when using different English language proficiency tests?

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Abstract

English language proficiency tests such as the TOEFL ITP or TOEIC L&R continue to be used in university settings to place students in different classes and to assess the effectiveness of English language programs. While considerable attention has been paid to student score data on an individual test, there is scant research on how a student's supposed proficiency level changes depending on the instrument. The goal of this study is to investigate the reproducibility of results when two different English language proficiency tests are used to assess listening skills. Listening test scores of 3rd year medical students ($n = 124$) on the official TOEIC L&R test in November 2023 were compared with their corresponding scores on a simulated TOEFL ITP test in February 2024. A statistical analysis using the nonparametric Wilcoxon Signed-Ranks Test revealed a significant difference ($Z = -7.661, p < 0.001$) between a student's listening CEFR proficiency level depending on the test used. A majority (62%) of students were ranked lower on the CEFR scale when taking the TOEFL compared to when they sat the TOEIC. This suggests that different results may be obtained according to the language proficiency test used.

J Med Eng Educ (2024) 23 (3): 58-60

Keywords listening proficiency, curriculum changes, language testing

1. Background and aims

Various English language proficiency tests are used in the context of English language programs at universities for student placement in classes according to their proficiency level in spite of ethical and validity concerns surrounding the use of language tests.¹ Additionally, it is common practice for universities to use test scores to provide exemptions and award course credits.²

The TOEFL ITP test is considered to be a better instrument in measuring a learner's ability to process information in English in an academic context, thus making it preferable for English language program administrators aiming to better prepare students aiming to participate in overseas study programs. On the other hand, in the

context of the Japanese labor market, TOEIC L&R test score certificates are widely used after graduation, with many companies setting threshold minimum scores for potential candidates. It is thus highly likely that both tests will continue to be implemented for university students at least for the foreseeable future.

The goal of this study is to investigate the reproducibility of results when two different English language proficiency tests are used to assess listening skills and to measure the impact of switching between instruments purportedly measuring the same language skills.

2. Methods

Listening test scores of third-year (Y3) medical students ($n = 124$) on the official TOEIC L&R test (hereinafter, 'TOEIC') were compared with their corresponding scores on a simulated TOEFL ITP test (hereinafter, 'TOEFL'). The tests were taken roughly three months apart (November 2023 and February 2024, respectively) and the students had no English lessons during this period; additionally, the test scores were used to decide the grade in a mandatory course, thus ensuring the students' engagement with each test. Listening test scores were converted to CEFR levels in order to place students into different proficiency groups.

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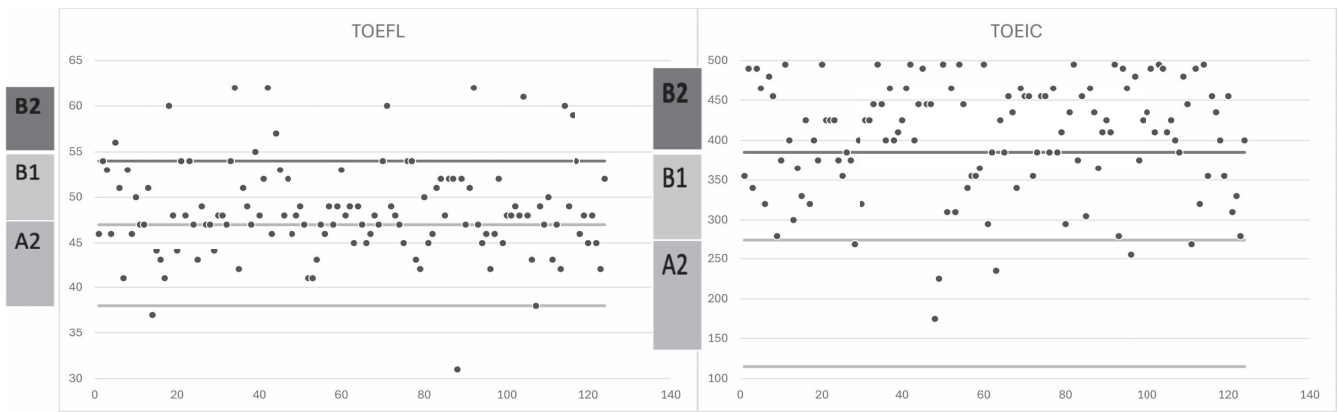


Figure 1. Individual student scores according to different listening tests

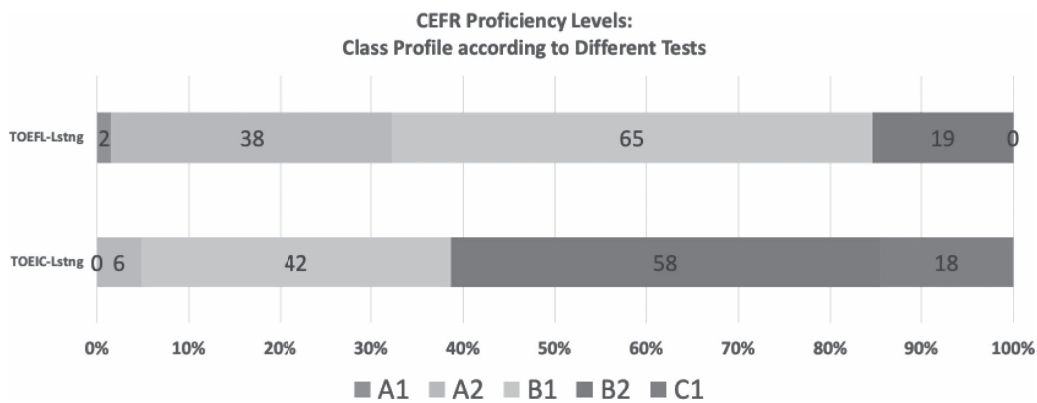


Figure 2. CEFR class profile according to different listening tests

A statistical analysis using the nonparametric Wilcoxon Signed-Ranks Test was carried out on SPSS to compare the students' proficiency levels according to each test.

3. Results

Students' individual scores are indicated above using scatter plots (Figure 1), with the x axis representing the listening score and the y axis the (randomly assigned) student number.

As can be seen in the above scatter plots, when sitting the TOEFL listening test, most students cluster around the threshold line separating CEFR B1 from CEFR A2 levels; in contrast, when taking the TOEIC listening test, a majority of students cluster above the threshold line separating CEFR B1 from CEFR A2 levels.

This is also reflected in the class average scores (48.46 (SD = 5.16) for the TOEFL and 403.51 (SD = 70.06) for the TOEIC) as well as in the class average CEFR level (CEFR B1 for the TOEFL and CEFR B2 for the TOEIC).

The results of an analysis of class profiles by assigning students CEFR proficiency levels according to their scores are displayed in Figure 2 above.

The statistical analysis using the nonparametric Wilcoxon Signed-Ranks Test revealed that there was a significant difference ($Z = -7.661, p < 0.001$) between a student's listening CEFR proficiency level depending on the

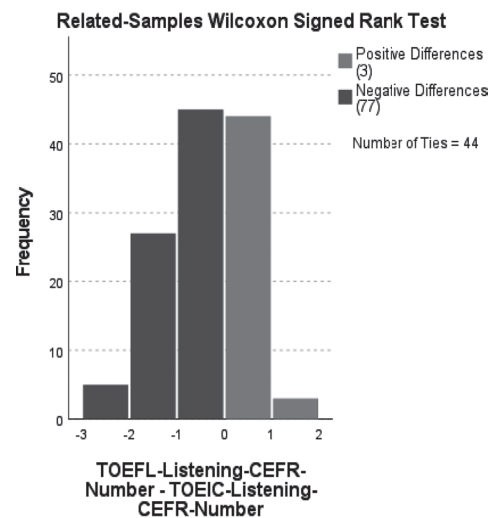


Figure 3. Difference in CEFR proficiency level when using different listening tests

test used. Thus, 77 (62%) students were ranked lower on the CEFR scale when taking the TOEFL compared to when they sat the TOEIC; only 44 (36%) students were assigned the same CEFR listening rank for both tests, and a minority of 3 (2%) students saw an increase in CEFR ranking when switching from the TOEIC to the TOEFL. These results are presented in a visually accessible format in Figure 3 above.

4. Discussion and conclusion

Our study revealed that different language proficiency tests may yield significantly different results for the same language learner even when using instruments purported to measure the same language skill (e.g., listening). These results suggest that the TOEFL listening test may be more challenging for Japanese university students than the TOEIC listening test. As medical students tend to score higher than students pursuing other majors, it is likely that these results would be replicated for other university student populations.

This finding is particularly troubling when we consider the potential negative impact of test scores on learners' motivation. For several decades, concerns have been expressed regarding the so-called washback effect³⁻⁵; additionally, most stakeholders nowadays acknowledge the incomplete picture provided by language proficiency tests which focus on passive communication skills (reading and listening) as opposed to active communication skills (speaking and writing).⁶ While recognizing the limitations inherent in these tests, their impact on curriculum decisions as well as the students' academic record remains considerable, making it crucial to learn more about the

validity of instruments designed to measure language proficiency.

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Effective L2 English reading instruction for pharmacy students: a literature review exploring the role of collaborative reading (CR) in L2 English comprehension

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Abstract

Effective communication in English is essential for medical professionals worldwide, including pharmacy students who are required to master the ability to read and comprehend scientific and medical literature. This study focuses on enhancing English proficiency, particularly reading comprehension, among pharmacy students in Japan. It examines the integration of collaborative learning into L2 English reading instruction, grounded in key theories such as Vygotsky's Social Constructivism and Collaborative Learning Theory. The study explores how collaborative learning fosters active participation, deepens understanding, and accommodates diverse learning styles, thereby improving student motivation and engagement. By reviewing the Model Core Curriculum for Pharmacy Education in Japan and analysing curriculum developments, the study underscores the importance of English proficiency in preparing pharmacists for global healthcare settings. It also highlights the benefits of collaborative reading (CR) approaches, such as enhanced comprehension, language development, and critical thinking skills, all of which are crucial for success in pharmacy education. The study calls for further research on the long-term impact of CR and the use of technology to optimize collaborative learning in pharmacy education, aiming to better prepare students for interdisciplinary teamwork and effective patient care in a globalized healthcare environment.

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Keywords EMP, collaborative learning, reading comprehension

1. Introduction

Effective communication in English is crucial for medical professionals globally. Pharmacy students are expected to learn to read scientific and medical articles, research papers, case studies, and other relevant materials written in English during their years in college. These tasks require the ability to identify key information, understand the context, and grasp the meaning of specialized terminology. Given the global nature of the medical and pharmaceutical fields, the ability to read and understand medical literature published globally is essential for staying informed about advancements

in medicine and for contributing to international research. However, non-native English speakers often face challenges when it comes to mastering English, which can negatively impact patient care and professional collaboration. Therefore, this study aims to identify and evaluate educational strategies to enhance English proficiency, with a particular focus on reading comprehension, among pharmacy students in Japan.

This study begins by constructing a theoretical framework for collaborative learning in L2 English reading instruction by reviewing previous research and identifying the essential theories and concepts that serve as the foundation for collaborative learning strategies aimed at improving reading comprehension. It then aims to provide a foundation for further exploration of collaborative approaches to enhancing L2 English comprehension on the part of pharmacy students in Japan. This foundation will not only help refine current educational practices, but also pave the way for future research that can contribute to more effective language instruction with regard to pharmacy students.

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2. Advancing pharmacy L2 English education in Japan

The most recent revision of the Model Core Curriculum for Pharmacy Education in Japan was released in 2022 (Reiwa 4).¹ This outlines the educational goals and competencies required to prepare pharmacy students for the demands of the pharmaceutical profession. This update reflects the latest advancements in pharmacy practice, healthcare needs, and educational strategies, building on previous versions to better prepare pharmacists for their evolving roles in the healthcare system. An overview of the curriculum emphasises the integration of scientific knowledge with practical skills, and the evolving role of pharmacists in healthcare. The focus is primarily on the fundamental qualities and capabilities required with regard to pharmacists, the relationship between pharmacy and society, and the foundational knowledge needed in pharmaceutical sciences. Additionally, the curriculum highlights the increasing need for pharmacists to engage in global healthcare settings, underscoring the importance of understanding and adapting to international standards and practices. This reference to globalisation suggests that English language skills are crucial, as English often serves as the lingua franca in global healthcare and scientific communication.

Suzuki examines the Model Core Curriculum, particularly in the context of a 20-year perspective on human resources development.² It emphasises the need for comprehensive education that aligns with societal needs, including communication skills and the ability to collaborate in team-based healthcare. These aspects suggest the importance of language proficiency, including English, as part of developing well-rounded pharmacists who can meet international standards and effectively communicate in diverse healthcare settings. Hashimoto et al. explore the evolution and current state of clinical pharmacy education in Japan, including curriculum changes, practical training, and challenges faced by pharmacy education.³ The paper highlights various aspects of pharmacy training such as inter-professional education, community pharmacy training, and health events for the public. It explains how pharmacy students engage in inter-professional education, collaborating with various healthcare professionals through simulated cases. This collaborative approach helps students develop skills in patient-centred medicine and enhances their communication within multidisciplinary medical teams.

Several studies have explored the objectives and challenges of English reading classes for pharmacy students in Japan, offering valuable insights into their integration within medical curricula. These studies underscore the importance of aligning English proficiency with medical education goals, and the ongoing shift towards learner-centred approaches in the Japanese context. Saiki et al.

provide a comprehensive analysis of the balance between global and regional influences on medical education in Japan, with a particular focus on English language training.⁴ The study argues for the integration of collaborative and active learning methods as part of this evolving educational paradigm. Medical education in Japan has increasingly embraced learner-centred approaches such as Problem-Based Learning (PBL), Team-Based Learning (TBL), and the flipped classroom. These methods promote autonomous learning, enhance problem-solving abilities, and encourage active participation. However, the transition to these methods presents challenges, particularly in terms of the role of educators as facilitators during discussions, which further emphasises the importance of collaborative learning in medical education.

Mayers et al. delve into the motivations driving Japanese medical students, including pharmacy students, to learn English.⁵ The study highlights a notable willingness to communicate in English, even in the face of challenges posed by the COVID-19 pandemic. Despite these challenges, students remain motivated by both personal and professional aspirations to improve their English skills. The findings suggest that incorporating collaborative learning formats into the classroom is an effective strategy to further enhance this motivation. Collaborative learning has been shown to increase student engagement and communication skills, making it a suitable approach for improving language proficiency in medical education. Noda and Watanabe analyse curriculum developments with regard to English education in medical schools, focusing on student needs and the need for improvements aimed at enhancing English reading and communication skills in the medical field.⁶ The study emphasises the importance of developing communicative competence and linking clinical courses with English for Medical Purposes (EMP) courses. This approach implies a need for more interactive and integrative learning methods, such as collaborative and active learning strategies, which align with the broader objectives of medical education. Sasajima et al. further explore the application of content and language integrated learning (CLIL) methodologies, demonstrating the value of integrating medical content into language learning.⁷ These studies highlight the significant role of English education in Japanese medical schools and the strategies required to improve English proficiency on the part of pharmacy students.

This section has provided a theoretical and contextual framework, exploring the broader objectives of English reading education within pharmacy curricula, and the shift toward learner-centred paradigms. It has also touched on student motivation for learning English and the integration of interdisciplinary knowledge, setting the stage for a detailed exploration of specific educational strategies.

3. Theoretical background

3.1 Collaborative learning

To investigate the effectiveness of the implementation of collaborative learning for enhancing L2 English reading skills among pharmacy students in Japan, it is crucial to consider the underlying theoretical frameworks that justify this approach. Several key theories provide a solid foundation for the use of collaborative learning. Firstly, Vygotsky's Social Constructivism offers a fundamental perspective on the importance of social interaction in learning.⁸ Vygotsky posited that knowledge is constructed through interaction with others, where learners co-construct understanding within a social context. This theory underscores the significance of collaborative learning environments, where students engage with peers to deepen their comprehension and language skills. Building on this, Collaborative Learning Theory as articulated by Johnson, Johnson, and Smith and Johnson and Johnson further elaborates on the benefits of students working together towards shared learning goals.^{9,10} According to this theory, collaboration among students not only enhances individual understanding, but also fosters a sense of community and mutual support. The theory highlights the value of group work, peer discussion, and shared problem-solving, all of which are integral components of the collaborative learning approach. Furthermore, Long's Interaction Hypothesis suggests that language proficiency is most effectively developed through meaningful interaction.¹¹ This hypothesis argues that when learners are engaged in communication that is purposeful and contextualized, they are more likely to acquire language skills. The Interaction Hypothesis aligns closely with the principles of collaborative learning, where students are encouraged to interact with texts and with each other, thereby enhancing their linguistic and cognitive development.

The work by Slavin is a seminal research article that summarizes evidence on the effectiveness of cooperative learning.¹² It is a key reference for understanding the empirical support behind collaborative learning strategies. Slavin developed theoretical frameworks that explain the effectiveness of cooperative learning, identifying key factors such as positive interdependence, individual accountability, and group processing as essential components for success. He designed and tested specific cooperative learning programs like STAD (Student Teams-Achievement Divisions) and TGT (Teams-Games-Tournaments), which provided structured methods for implementing cooperative learning in classrooms. His research offered strong empirical support for cooperative learning, demonstrating that students engaged in these activities often achieve better academic results, have more positive attitudes toward learning, and develop stronger social skills compared to those in traditional learning environments.

Bruffee focuses on collaborative learning within higher

education, providing insights into how these concepts apply specifically to college and university settings.¹³ He advocates for a shift from traditional, individual-focused learning to a more interactive, peer-to-peer approach, where students construct knowledge through dialogue and group work, highlighting the role of the teacher as a facilitator rather than the sole source of knowledge and discusses strategies for effectively structuring and assessing collaborative learning. His insights underscore the benefits of collaborative learning for developing critical thinking, communication skills, and preparing students for collaborative work in their future careers. Gillies offers a more applied perspective, integrating theory and practice to guide educators in implementing collaborative learning in their classrooms.¹⁴ Her work guides educators on how to structure group activities, manage classroom dynamics, and ensure meaningful student interactions. She emphasizes the teacher's role in facilitating and monitoring group work, offering practical tips to create a collaborative learning environment. Gillies also addresses assessment, highlighting the importance of evaluating both the process and outcomes of group work.

Collaborative learning has been shown to positively impact students' motivation and engagement in English learning. When students work together, they often find the learning process more enjoyable and are more motivated to participate actively. Peng et al.'s study examines how collaborative learning enhances Chinese university students' motivation and engagement in English language learning.¹⁵ The research shows that working in groups fosters a supportive environment, making students feel more confident and less isolated, which boosts their motivation. Loes examines how collaborative learning impacts academic motivation among students from 17 U.S. institutions.¹⁶ The study finds that collaborative learning significantly boosts academic motivation over four years of undergraduate study. Additionally, the positive effect of collaborative learning on motivation appears consistent across different racial and ethnic groups.

Thus far, collaborative learning has been shown to encourage active participation, as students engage in discussions and interact with the material, leading to a deeper understanding and greater enjoyment. It also accommodates diverse learning styles, enabling students to learn from one another and engage more fully with the content. Overall, these studies demonstrate that collaborative learning enhances students' involvement and interest in the learning process.

3.2 Collaborative reading (CR)

A collaborative reading (CR) approach refers to a pedagogical method in which students collectively engage in the comprehension and analysis of texts. This approach typically involves peer discussion, shared reading, and group analysis, which are widely recognized as key components in collaborative learning practices. By integrating Vygotsky's

Social Constructivism, Collaborative Learning Theory, and the Interaction Hypothesis, these theories strongly advocate for the application of CR in L2 English reading education. They collectively highlight the importance of collaboration, social interaction, and peer-assisted learning, reinforcing the idea that CR can significantly improve reading comprehension and language acquisition on the part of pharmacy students. The principles of the CR approach are reflected in those academic discussions on collaborative learning and reading comprehension strategies.

The exact concepts related to CR, such as peer discussion, shared reading, and group analysis, are introduced throughout the paper by Reznitskaya et al.¹⁷ The authors elaborate on these ideas in sections discussing the theoretical background and methodology: the theoretical framework of collaborative reasoning, emphasizing dialogic interactions, peer collaboration, and the role of shared cognitive tasks in developing reasoning skills. The methodology section describes how students engage in group discussions, with shared reading and group analysis being key components of the CR approach. These sections highlight how students work together to analyze texts and engage in meaningful discussion, which aligns with the definition of CR as a pedagogical method.

Edutopia describes the implementation of CR strategies in educational settings, emphasizing shared reading, peer discussion, and group analysis as key components in a five-step process.¹⁸ This process begins with the teacher setting a clear purpose for the reading activity, guiding students to approach the text with focus. Students then read the text, either individually or in groups, to understand its content. During reading, they actively engage by annotating the text, marking important points and making notes. Afterward, they participate in group discussions, sharing their annotations and exploring different interpretations. Finally, students synthesize the information and reflect on their learning through activities such as summarizing, discussing connections, or creating visual representations, which helps reinforce their understanding and its application. The process encourages active participation, collaboration, and deeper comprehension of texts, making it a valuable approach for enhancing reading skills in educational settings.

In a similar educational model, namely Collaborative Strategic Reading (CSR), the approach is broken down into structured phases where students work in small groups to apply reading strategies, discuss their understanding, and engage in mutual support to grasp complex texts. Klingner and Vaughn provide an in-depth explanation of the CSR method.¹⁹ According to them, CSR involves a four-step process where students engage with the text to enhance comprehension. Initially, they preview the text to activate prior knowledge and set reading goals. As they read, they identify areas of understanding and confusion, using strategies to address any difficulties. They then

summarise key ideas to ensure that they have grasped the main points. Finally, they review and reflect on the content, connecting it to their prior knowledge and experiences to reinforce learning. CSR combines cooperative learning and reading comprehension strategies to help students better understand and retain what they read. The benefits of CSR include enhanced comprehension, cooperative learning, and support for diverse learners.

Moreover, several empirical studies have explored the impact of collaborative learning on L2 English reading development. These studies consistently indicate that collaborative approaches are effective in terms of improving reading skills and language proficiency, further validating the theoretical underpinnings of this approach. A study by Berzener and Deneme demonstrates that cooperative learning strategies, specifically the Student Teams-Achievement Divisions (STAD) method, significantly improves reading comprehension among EFL learners.²⁰ In this approach, students are organized into small, diverse teams to collaborate on understanding the material presented by the teacher. After receiving instruction, teams work together to reinforce each member's comprehension through discussion and problem-solving. Individual quizzes or assessments are then taken to gauge understanding, and students' scores are compared to their previous performances. Teams are rewarded based on collective improvement or consistent high scores, with top-performing groups receiving recognition.

To conclude this section, the components of a CR approach underscore the significance of integrating peer discussion, shared reading, and group analysis into educational settings, particularly in pharmacy education. These components, rooted in established collaborative learning theories and supported by empirical evidence, play a critical role in enhancing student comprehension, engagement, and critical thinking skills. The alignment of CR with structured methods such as the five-step process described by Edutopia, Collaborative Strategic Reading (CSR), and Student Teams-Achievement Divisions (STAD) further validate its effectiveness in promoting the deeper understanding and retention of complex texts.

4. Collaborative reading (CR) in pharmacy L2 English education

This section delves into the implementation and benefits of CR in pharmacy education, highlighting its transformative impact on students' academic and professional development. It explores how CR can be effectively implemented in pharmacy education and details the concrete benefits it offers, including enhanced comprehension, improved language development, increased critical thinking, and preparation for collaborative practice and interdisciplinary learning.

4.1 Enhanced comprehension and engagement

The implementation of CR within pharmacy education offers several significant benefits that directly enhance students' academic and professional competencies. One of the primary advantages of CR is its ability to enhance comprehension. According to Graham and Perin, collaborative learning facilitates a deeper understanding of content through peer explanation and discussion.²¹ This process allows students to clarify complex concepts and reinforce their knowledge, which is particularly valuable in the context of pharmacy education, where students frequently encounter intricate medical texts. Additionally, CR has been shown to increase student engagement. Research by Johnson and Johnson indicates that students involved in collaborative activities demonstrate higher levels of motivation and participation.²² This increased engagement is crucial in the rigorous field of pharmacy, where active involvement in learning processes can lead to better retention of knowledge and improved practical application.

4.2 Language development and critical thinking

Language development is another critical benefit of CR, particularly for pharmacy students who must navigate complex medical terminology. Swain and Lapkin emphasize that interaction during collaborative work enhances vocabulary acquisition and the effective use of language.²³ This aspect of CR is essential for pharmacy students, as precise language skills are vital for clear communication in both academic and professional settings. Furthermore, CR fosters the development of critical thinking skills. King highlights that collaborative work encourages students to engage in higher-order thinking such as analysis, synthesis, and evaluation.²⁴ These skills are indispensable for pharmacy students, who must critically assess information and make informed decisions in their future careers. The development of these skills is directly linked to improved academic outcomes and the ability to apply knowledge in clinical settings.

4.3 Preparation for interdisciplinary learning

Pharmacy education requires the integration of knowledge from various fields such as pharmacology, medicinal chemistry, and patient care. Collaborative learning facilitates this integration by allowing students to share and synthesize information from different perspectives, leading to a deeper understanding and retention of complex concepts.²⁵ CR allows pharmacy students to discuss and clarify difficult concepts together, which can improve their overall understanding and retention of the material. This mirrors how collaborative care models in healthcare improve patient adherence and outcomes through shared expertise and continuous monitoring. Pharmacy students often engage in interprofessional education alongside students from other health professions such as medicine, nursing, and physical therapy.

4.4 Skill development in decision-making and problem-solving

Pharmacy students engaging in CR are exposed to a range of different viewpoints, encouraging critical thinking and the ability to assess and address various patient needs. Research has shown that such active learning strategies improve students' ability to apply knowledge in clinical scenarios and make informed decisions.^{26,27} Discussing real-world cases and current studies during CR sessions helps pharmacy students apply theoretical knowledge to practical scenarios, thereby enhancing their decision-making skills. Collaborative care requires continuous assessment and the adjustment of treatment plans based on patient progress, fostering critical thinking and adaptability among healthcare providers.²⁸

4.5 Engagement and motivation in learning

CR creates a more engaging and motivating learning environment. It encourages active participation, critical thinking, and peer support, leading to better academic performance and a more positive attitude towards learning. Studies such as the one by Han et al. have shown that students involved in collaborative learning are more likely to be engaged and motivated, resulting in improved learning outcomes.²⁹ By incorporating CR into pharmacy curricula, educators can better equip students with the comprehension, engagement, language, and critical thinking skills necessary for success in both their studies and their future professional roles. CR in pharmacy education is closely aligned with real-world healthcare practices.

This section has moved from theoretical concepts to practical applications. It explores how CR can be implemented in pharmacy education and details the concrete benefits it provides, including improved comprehension, increased language skills, and enhanced critical thinking. The relevance of these benefits to pharmacy education cannot be overstated, as CR not only aids students in understanding complex medical texts but also improves communication skills, which are essential for effective patient care and professional collaboration.

5. Conclusion

Research-based evidence underscores the efficacy of collaborative learning within pharmacy education. The implementation of CR provides substantial benefits, enhancing students' comprehension, engagement, language development, and critical thinking skills that are vital for success in the pharmacy profession. Furthermore, these collaborative approaches effectively prepare students for interdisciplinary teamwork, reflecting the collaborative nature of modern healthcare. This alignment ensures that pharmacy students are not only equipped with the necessary academic skills but also ready to contribute effectively to

patient care and engage in productive collaboration with other healthcare professionals. However, there appears to be a lack of substantial empirical evidence regarding the effectiveness of the CR approach. Researchers and educators within pharmacy education should persist in actively implementing CR methodology. This continued application is essential for generating valuable outcomes and enhancing overall educational programs.

To further advance the understanding and application of CR in pharmacy education, it is recommended that future research include extensive longitudinal studies involving a larger and more diverse group of pharmacy students to assess the long-term impact of CR on comprehension and language proficiency. Additionally, the role of technology, including digital and multimedia resources, e-learning platforms, and language learning apps, should be investigated to determine how these tools can enhance collaborative reading activities. Moreover, examining the impact of specialized training programs for educators on the effective implementation of CR techniques will provide valuable insights into optimizing instructional practices.

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Enhancing medical students' English proficiency: Insights on engagement and motivation from the student perspective

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Abstract

With the growing number of foreigners residing in Japan, it is essential for medical doctors, even those in rural areas, to improve their English proficiency. This study aimed to better understand medical students' experiences in English and Medical English courses and to find ways to enhance their engagement and motivation in these courses.

A total of 303 medical students, from first to sixth year at Saga University, participated in a survey regarding English and medical English. While a significant percentage expressed a desire to achieve fluency in English (77%) and to effectively use English in medical settings (64%), many did not allocate sufficient time to English and Medical English courses. Nearly half of the students indicated that they felt compelled to prioritize other courses over English to avoid retaking exams. Students suggested that incorporating group work, conversational sessions with native English speakers, offering more courses taught in English, and expanding international exchange programs could increase their motivation and maintain their interest in both English and medical English.

It is clear that the volume and complexity of medical knowledge and skills required of students have increased in recent years. Consequently, students may not enjoy English courses due to the high pressure and demands of other medical classes. Implementing active learning strategies, conversational sessions, and teaching a portion of other classes in English may improve students' motivation to learn medical English.

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Keywords Medical English proficiency, English curriculum, motivation, student survey

1. Introduction

The number of foreign residents in Japan has significantly increased in recent years. The rise has sparked debate over whether medical doctors, particularly those working in rural areas, need to be fluent in English to effectively communicate with foreign patients. There is a common belief that publishing research papers and presenting

studies at academic conferences in English is crucial for medical doctors and researchers to build successful careers in academia. However, doctors who primarily treat Japanese patients have traditionally faced little to no pressure to master medical English. The situation is rapidly changing. With the growing number of foreigners residing in Japan, it is increasingly imperative for medical doctors, even in rural areas, to enhance their English proficiency. This study examines the current state of English and medical English education and identifies key elements that contribute to student engagement and motivation in these English courses.

1.1 Immigration in Japan

Japan is currently experiencing a super-aging society coupled with a declining birthrate, which has led to a need for foreign labor to support the economy and welfare systems. In response, the technical intern training program¹ was revised in 2017 to provide employment opportunities

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for foreign nationals and to attract foreign talent. The same year saw the enactment of the Act on Proper Technical Intern Training and Protection of Technical Intern Trainees,² which facilitated higher wages and better working conditions for foreign workers. In 2023, the total number of foreign workers exceeded three million, marking the highest record since immigration surveys began.³ Over the past decade, there has been a notable increase in immigrants from China, Vietnam, Indonesia, and the Philippines.⁴ When foreign individuals cannot speak sufficient Japanese to communicate their medical concerns, English often becomes the preferred alternative. As globalization continues to influence clinical settings, it is becoming increasingly important for medical professionals in Japan to improve their English proficiency.

1.2 Current state of English and Medical English Education

The “Model Core Curriculum for Medical Education,” a guideline outlining the competencies that medical students should achieve by graduation, was revised in 2022.⁵ However, it lacks specific content or teaching methods for English and Medical English. The only stated learning objective is to be able to read and understand the outline of English medical articles under the category of “scientific inquiry.”⁵ Recognizing the growing importance of medical English, the Guidelines Committee of the Japanese Society for Medical English Education, led by core members of the Society for Medical English Education, was established to create guidelines for medical English education in medical schools.⁶ These guidelines categorize English Proficiency into four areas: Vocabulary, Reading, Writing, and Communication, providing detailed descriptions of the content and objectives for each category.

Ideally, medical English instructors would have ample lecture time to achieve these goals. However, the large number of other medical courses often results in English and Medical English lectures being cut short. In this challenging environment, it is not uncommon for educators to struggle with efficiently covering all necessary content and maintaining student motivation within the limited time available.

1.3 Students’ desires for English and Medical English

As Medical English educators, we feel a strong responsibility to provide high-quality English and Medical English courses. We strive to improve these courses by comparing them with those offered at other universities. At Saga University, we use a student evaluation form to incorporate students’ feedback into lecture improvements; however, we have observed that the official evaluations sometimes differ from the informal feedback gathered through conversations with students. It is crucial to understand students’ genuine desires and opinions regarding English and Medical English courses from

different levels of medical education. This study aimed to better understand medical students’ experiences in English and Medical English courses, with the goal of enhancing their engagement and motivation to improve their medical English proficiency.

2. Methods

An online survey regarding English and Medical English courses was sent to first through sixth year medical students. Respondents were asked to rate each question on a Likert scale, with 0 being “not at all true” and 10 being “very true”. Examples of questions include: “Do you like English (or medical English)?,” “Do you want to be fluent in English?,” “Do you want to use English in clinical settings?,” “How much did (do) you study for those courses?,” and “What are the reasons you have not been able to study much for those courses?” Additionally, students were invited to provide comments and express their desires regarding English and Medical English courses. To simplify the analysis, responses of 0 to 3 were considered “almost never true,” 4 to 6 were considered “fairly true,” and 7 to 10 were considered “very true.”

3. Results

A total of 303 medical students from first to sixth year at Saga University participated in the survey, representing approximately half of the university’s medical students.

In response to the question, “Do you like English?,” 10 students (3%) indicated that they do not like English, 61 students (20%) said they like English, and 232 students (77%) said they like English very much (**Figure 1**). When we asked if they liked medical English, 48 students (16%) responded that they do not like it, 148 students (49%) said they like it, and 107 students (35%) said they like medical English very much (**Figure 2**).

Regarding the question, “Do you want to be fluent in English?,” 9 students (3%) answered that they do not want (or need) to be fluent, 55 students (18%) said they want to be fluent, and 239 students (79%) expressed a strong desire

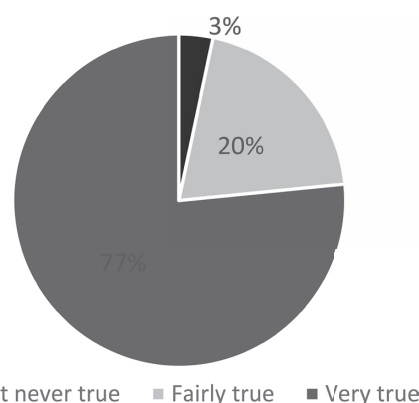


Figure 1. Do you like English? (N= 303)

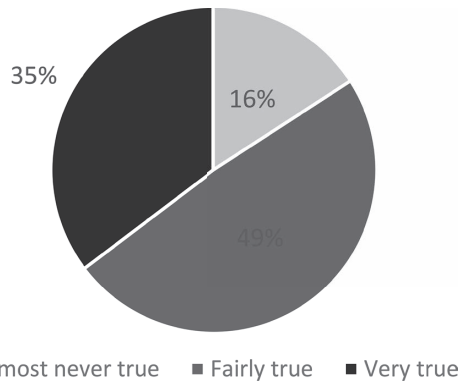


Figure 2. Do you like medical English? (N= 303)

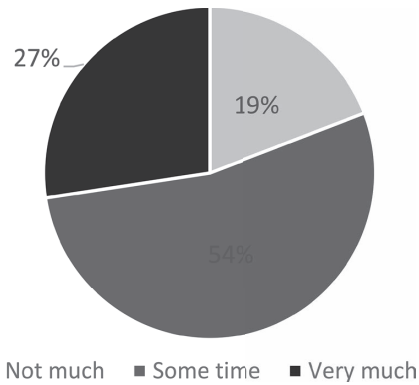


Figure 5. How much did (do) you study for English/Medical English? (N= 303)

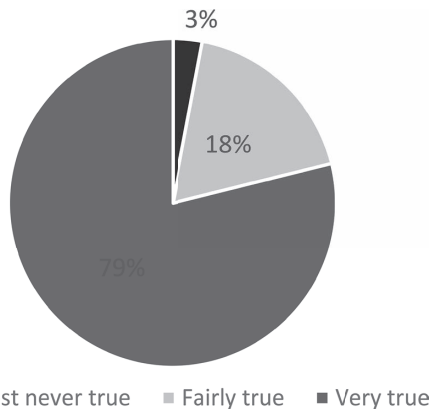


Figure 3. Do you want to be fluent in English? (N= 303)

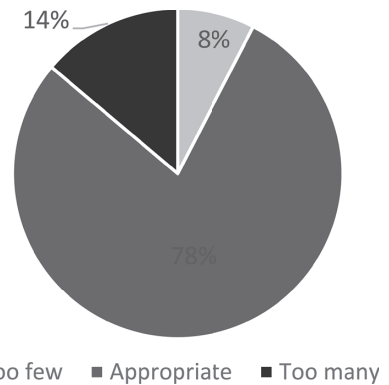


Figure 6. Is the number of classes of English/Medical English appropriate? (N= 303)

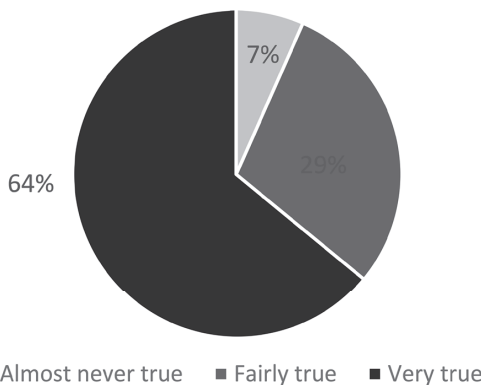


Figure 4. Do you want to use English in clinical settings? (N= 303)

to be fluent in English (Figure 3). For the question, “Do you want to use English in clinical settings?, 20 students (7%) responded that they do not want (or need) to use medical English in clinical settings, 89 students (29%) said they want to use it, and 194 students (64%) said they really want to use medical English in clinical settings (Figure 4).

When asked how much time the students spent (or are currently spending) studying for English and Medical English courses, 95 students (31%) responded, “not much”, 162 students (53%) said they spent (or are spending) “some time”, and 46 students (16%) indicated they spent (or are spending) a lot of time on these courses (Figure 5). Among those who said they did not study much (or are not currently studying) for English and Medical English courses, the top

reasons cited were: the heavy burden of other courses (n=145, 48%), feeling that they are not good at English and/or medical English (n=121, 40%), and not feeling the need for English and/or medical English (n=33, 11%). Regarding the adequacy of the number of English and Medical English classes, 23 students (8%) felt there were too few classes, 238 students (79%) thought the number was appropriate, and 42 students (13%) responded that they were too many (Figure 6).

Finally, when students were asked about their desires or requests related to English and Medical English education at the university, the most common responses were: more opportunities to speak with English native speakers (n=82, 27%), more instructors integrating English and medical English vocabulary into their courses (n=52, 17%), a greater number of teachers who speak English fluently (n=27, 9%), and more opportunities to study abroad (n=115, 39%).

4. Discussion

The aims of this study were to better understand medical students' experiences in English and Medical English courses to enhance their engagement and motivation, ultimately improving their knowledge of Medical English.

While it is evident that many students have a positive attitude towards English and express a desire to become fluent, this enthusiasm declines when it comes to medical

English. Fewer students enjoy medical English or express a strong desire to use it in clinical settings. This suggests that students may find medical English particularly challenging and lack confidence in using it. Currently, academic papers are often used in courses to help students read and become familiar with medical English terminology, as ability to read and understand English manuscripts is a goal outlined in the Model Core Curriculum for Medical Education.⁵ While reading and writing skills are essential, especially for those pursuing academic careers, students seem to prefer more practical, interactive approaches to learning. The fact that more than one-third of the students expressed a desire to study abroad may indicate their strong wish to engage with real-world English. This highlights the need to offer more conversational and interactive classes.

Although many medical students aspire to become fluent in English, they often do not appear to enjoy medical English courses due to the high pressure and demands of other medical classes. The volume and complexity of medical knowledge and skills that students must acquire have been increasing, leading them to prioritize other courses to avoid failing the exams. Consequently, English and Medical English courses become lower priorities, resulting in diminished interest and motivation to study these subjects. This issue is compounded by the limited time allocated to teaching English and medical English.

To address these challenges, it would be ideal for various instructors to incorporate English into their teaching. This approach would allow students to learn course materials in both Japanese and English, helping them understand how to use English terms in real-world scenarios. Additionally, there is a clear need to create opportunities for students to practice clinical examinations with native English speakers. Feedback from native speakers could significantly boost students' motivation and confidence in using medical English. Given the increasing number of foreign patients at our university hospital, it is urgent to provide students with opportunities to practice clinical examinations in English, potentially through settings such as the Objective Structured Clinical Examination (OSCE).

To meet these needs, increasing the number of native English-speaking instructors and improving the English proficiency of current teachers should be priorities.

Implementing active learning strategies, holding conversational sessions, and teaching a portion of other medical classes in English may also enhance students' motivation to learn and use medical English.

5. Conclusion

Given the growing number of foreigners residing in Japan, it is essential for medical doctors, even those in rural areas, to enhance their English proficiency. While many medical students have a positive attitude toward English and wish to speak it fluently, they face difficulties studying medical English due to lack of motivation and the heavy burden of other courses. Increasing class time to provide consistent and effective English and Medical English lessons is challenging, as the volume and complexity of medical knowledge and skills required to become professional doctors continue to rise. Although class time may be limited, incorporating active learning strategies, holding conversational sessions, and integrating English into other medical classes can help enhance students' motivation to learn and use medical English.

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Re-evaluating listening activities in medical English lessons

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Abstract

Most ESL/EFL (English-as-a-Second or Foreign Language) textbooks contain listening activities to give students the chance to hear spoken English. These activities usually employ native English speakers from America and Britain, as these are the accents students are mostly familiar with hearing in various forms of art, entertainment, and media. However, the number of people who speak English as a second language is increasing, and with immigration and tourist numbers increasing post-COVID, the chances of encountering a non-native English speaker who is speaking English will naturally increase, as well. In Japan, Japanese people are more likely to hear English from a Chinese or Vietnamese national than they would an American or British national who has spoken English for their entire life. Because of this, the time has come for listening activities in English textbooks to be re-evaluated and discussed. Between 2022 and 2023, 208 Japanese students were given a survey on their preferences regarding hearing English during lessons. Results revealed that 75% of students claim they understand English better when it is spoken by a Japanese person, and 39% prefer hearing English when spoken by a non-native person (for example, a Japanese person). Students were then presented with two audio files—the first one containing two native English speakers and the second one containing one native English speaker and a Japanese native speaking English. 54% of students stated the second listening was easier to understand. While these numbers do not support the need to replace the trend of using native English speakers for listening activities, they do support rethinking how English is presented in lessons, and whether this approach supports the current reality of globalization and its impact on the English language.

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Keywords English-as-a-Foreign-Language (EFL), second-language acquisition, listening, native-speakerism, medical English

1. Introduction

This article expands on the presentation that was given at the JASMEE 2024 conference in Nagoya, Japan. Before delving into medical English, listening activities, textbooks, or what motivates and de-motivates Japanese students, it is important to provide a fundamental definition that will underscore all of these topics and bind them together to allow a deeper understanding and discussion of the topic

at hand. Culture, a widely confusing and often simplified term, has been described in both simple and complex terms: Peterson (1979) defined culture as a “map for behavior”¹; Linton (1945) defined it as a “configuration of learned behaviors and results of behavior whose component elements are shared and transmitted by the members of a particular society.”² In the case of this paper, with situations involving educators, students, and audio recordings using a variety of speakers, all from different cultures, the meaning of culture will become vitally important.

2. Listening activities

Regarding listening activities found in English-as-a-Foreign-Language (EFL) medical English textbooks, the most common trait that these listening activities have are the voice actors. Twenty-two (22) textbooks were reviewed by the author, and all but one had listening voice actors from English-speaking countries, mainly America and England. Only one medical English textbook that was

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reviewed showcased voice actors whose first language was not English; unfortunately, according to the publisher, this textbook is no longer in print. This lack of listening activities that employed non-native English speakers prompted the author to explore the usefulness of such activities for Japanese medical students in Japan, and how this might affect motivation levels for studying English.

According to the Organisation for Economic Cooperation and Development (OECD, 2023), Japan's foreign population stood at 2.2%, with the main countries of nationality being China, Vietnam, and South Korea. Obviously, these three countries' official language is not English, but one could argue that the chances of a Japanese student of English encountering a foreign person whose native language was Chinese, Vietnamese or Korean were higher than a native English speaker from America or England.³ Willey et al. (2020) point out in their needs analysis of doctors in Japan that using English in "unscripted situations causes stress for these MDs, and that most of their English-speaking patients are not native English speakers" (p. 143).⁴ If this is the case, along with the impact of globalization and the internationalization of education institutions in Japan, then an argument could also be made for the inclusion of non-native English speakers in English textbooks.

With concepts such as learner agency, or a student's "capacity to control and coordinate their actions, beliefs and emotions to reach goals" (Thompson, 2020, p. 17)⁵ and learner autonomy permeating the field of education, one major component is missing: students' perspectives on what is being presented to them in class, and how it is being presented. That missing component can be summarized in three questions:

- What do students think about listening activities that exclusively contain American and British speakers?
- How do these activities impact their motivation to learn and communicate in English?
- How would hearing non-native English speakers speaking English affect their motivation to learn and communicate in English?

3. Method

3.1 Participants

The participants (n=208) were 1st year medical students attending a private medical school in Japan. Two groups were chosen during the 2022 (n=97) and 2023 (n=111) academic years, and within these groups, two students were of mixed nationality (half-Japanese, half non-Japanese), and one student was a returnee, having spent an extensive amount of time abroad in America. Their English levels ranged from very basic to advanced, based on TOEFL scores and classwork.

In your opinion, is it easier to understand English when it is spoken by a native or non-native speaker?

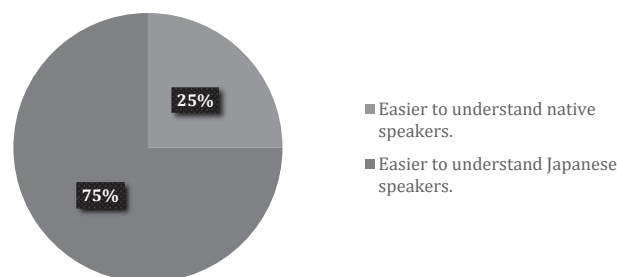


Figure 1. Understandability of English When Spoken by Native and Non-Native Speakers

When listening to textbook audio, which would you prefer?

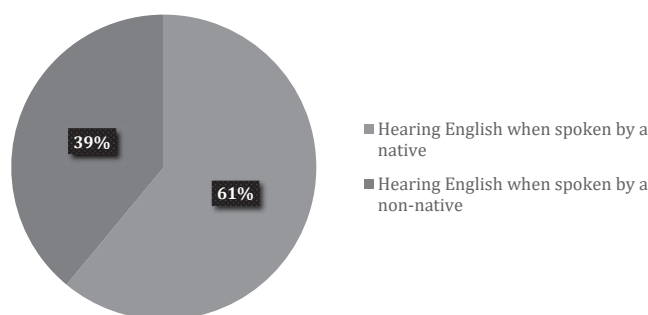


Figure 2. Textbook Audio Preferences

3.2 First instrument

Two survey questions, written in both English and Japanese, were first given to the students via Google Classroom. The first question asked, based on their experience, whether English is easier to understand when it is spoken by a native English speaker—for example, someone from America—or a non-native speaker from Japan. 75% of students stated they understand English better when it is spoken by a Japanese person, while 25% said it is easier to understand English from a native speaker (Figure 1). The second question asked if they would prefer to hear English spoken by a native or non-native person when hearing audio from a textbook. 39% of students prefer to hear English spoken by a non-native, compared to 61% who prefer a native speaker (Figure 2).

Students were then asked to listen to two audio tracks, one containing two native English speakers, and the second containing one native English speaker and one Japanese speaker. The students were not informed as to the order of the audio, nor the nationalities of the speakers. They were then asked which audio was easier to understand through a Google Classroom survey questionnaire. 46% of students claimed the audio with the two native speakers was easier to understand, while 54% chose the audio containing the Japanese speaker (Figure 3).

Which audio track was easier to understand?

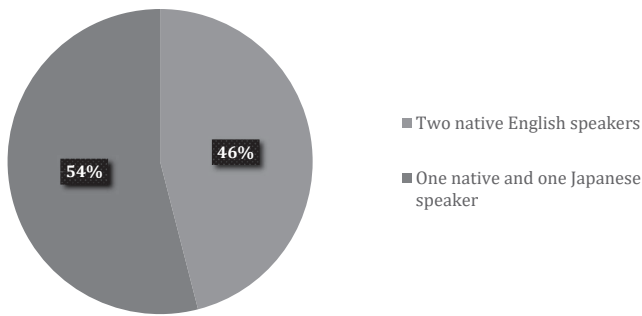


Figure 3. Participant Understanding of Audio Tracks

3.3 Second Instrument

After completion of the first survey and the collating of data, the level of student motivation came into question, specifically how students perceive their own level of motivation when engaged in listening activities with native English speakers. Therefore, in 2024, a new cohort of 1st year medical students (n=144) were asked to respond to three statements, two of which were about their perceived levels of motivation (the third will be discussed below). These questions were written in English and Japanese, and were distributed via Google Classroom.

The first question asked whether they would be motivated or self-conscious when listening to native English speakers. 42% of students stated they would be motivated to speak English confidently, while 58% stated they would feel self-conscious about their English ability. The second question asked the same question but changed “native English speaker” to “Japanese person speaking English.” In this case, 57% of students stated they would be motivated to speak English confidently, while 43% stated they would feel self-conscious about their English ability to understand.

4. Discussion

When given a voice, students prefer more diversity in their learning, particularly with listening activities. While the numbers do not reflect a dramatic shift from the current situation, they should be large enough for native and non-native medical English educators in Japan to reflect on the effectiveness of how they have been teaching Japanese students and what materials they have been using to encourage English-language usage inside and outside the classroom. If the numbers don't move educators to open discussion and a reevaluation of current teaching methods, perhaps the final question of the second survey will.

Students were asked to agree or disagree on a final statement (again, written in both English and Japanese and distributed through Google Classroom): It is preferable to have a variety of English speakers (native and non-native) in textbook exercises. 81% of 144 students agreed that it

would be helpful to hear a variety of voices, not just “perfect” English spoken by native English speakers. It is important to note that this cohort did not listen to the audio files, nor were they aware of the previous surveys conducted in 2022 and 2023.

At the beginning of this article, culture was mentioned as an important factor in this study. Educational institutions hire non-Japanese faculty members in order to bring an authenticity to English classes, so naturally a Western approach to learning occurs in the classroom. However, it should be considered that “the introduction of Western [cooperative learning] approaches in the Asian cultural context has been criticised as undermining traditional teaching approaches and even referred to as education neocolonialism (Phong-Mai, et al., 2009)” (Saunders-Wyndham & Smith, 2020, p. 123).⁶

For years, research into the teaching of English alluded to the use of non-native English speakers in listening and pronunciation activities by stating the educational goals for speaking and pronunciation should be clear and understandable speech, not native-level pronunciation (Levis, 2005; Thomson, 2014).^{7,8} And yet, most English textbooks continue to use only native speakers for their listening activities. The discussion being proposed here is not to ban the use of native English speakers, but, as students have themselves expressed, to diversify the voices being heard in order to better represent the reality of a globalized society.

In addition, and to conclude, if English educators can utilize listening activities that highlight Japanese speakers who are speaking English, then this could motivate students to speak more in and out of class because they are being shown that when Japanese people speak English, as imperfect as it may be, people will listen and understand.

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医学英語教育のための効果的な e ラーニング教材の開発と評価

Development and evaluation of effective e-learning materials for medical English education

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要旨

本研究では、医学生の医学英語能力向上を目的としたインタラクティブな e ラーニング教材を開発し、その効果を評価した。対象は呼吸器講座を履修済みの医学部 3 年生で、胸部 X 線画像を使って英語で疾患名を特定する能力を育成することを目指した。教材は H5P Lumi で作成され、多様な演習問題を含むとともに、学習者のスキルに応じた時間制限を設定した。評価結果は、教材が学習意欲と成果の向上に寄与する可能性があることを示している。しかし、医療画像の読影力や医学英語能力の具体的な向上については明確な結論を導き出せなかった。今後は、客観的な評価指標の導入、適切な統計モデルの適用、そして継続的な教材改善が必要である。

Abstract

This study aimed to develop and evaluate interactive e-learning materials designed to enhance medical English proficiency among medical students. The target population comprised third-year medical students who had completed a respiratory medicine course, with the objective of cultivating their ability to identify diseases in English using chest X-ray images.

The educational material was created using H5P Lumi, incorporating a variety of exercises and implementing time constraints adaptable to learners' skill levels. Evaluation results suggest that the material may contribute to improving both learning motivation and educational outcomes. However, no definitive conclusions could be drawn regarding specific improvements in medical image interpretation skills or medical English proficiency. Future research directions should focus on the introduction of objective evaluation metrics, the application of more appropriate statistical models, and continuous refinement of the educational materials.

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Keywords e-learning, medical English proficiency, interactive educational material, chest X-ray images, learning motivation, educational outcomes

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1. 緒 言

1.1 背 景

現代の医療現場では、グローバル化が進展する中で英語の重要性がますます高まっている。国際的な患者対応や研究発表、学術論文の執筆など、医療従事者が英語を使用する機会は多岐にわたる。特に医療英語は専門用語が多く、一般の英語とは異なるスキルが求められるため、効果的な教育方法が必要とされている。しかし、従来の教室ベースの学習方法には、学生の興味を引きつけるのが難しいという課題がある。また、講義形式の授業は一方通行になりが

ちで、学生が積極的に参加する機会が限られている。よって、理論を学ぶだけではなく実際の医療現場で使えるスキルを身につけるための実践的な演習が不足していることも問題である。さらに、教室ベースの学習方法は時間や場所に制約があり、柔軟性に欠けるといふ点も指摘されている。

1.2 目的

本研究の目的は、医学生 of 医学英語能力を効果的に向上させる e ラーニング教材を開発し、その教育効果を評価することである。優れた e ラーニング教材を開発するには、教育学の理論に基づいて計画的に作成し、成果物の教育的効果を検証し、改善するプロセスが必須である。具体的には、学生が主体的かつ積極的に学習できるインタラクティブな教材を作成し、ゲーム要素を取り入れることで学生の興味を引きつけ、学習意欲を高めることを目指す。このアプローチにより、医学生が楽しみながら医学英語を学び、その結果として高い学習成果を達成することが期待される。

2. 研究方法

2.1 対象者

本研究の対象者は、呼吸器講座を履修済みの医学部3年生である。

2.2 学習目標

学習目標は、胸部 X 線画像を読み取り、疾患名を英語で答えることができることである。

2.3 教材作成

e ラーニング教材を開発する方法として、H5P Lumi^{1,2} という作成ソフトを選択した (図 1)。また、学習者の学習意欲向上を図るため、その e ラーニング教材にゲーム形式を取り入れた (図 2)。

教材内容としては、以下の要素を含む：

Lecture：疾患の基礎知識をまとめたセクション。

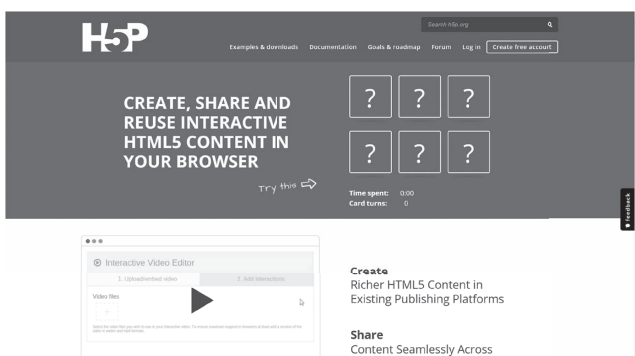


図 1. H5P Lumi のホームページ (<https://h5p.org/>)

Japanese to English：疾患名を英語に翻訳する問題。

英語から画像：疾患の英語名に一致する X 線画像を選ぶ問題。

画像所見指摘問題：画像上の特異的所見を指摘する問題。

画像ホットポイント：画像上の所見名をタップして答える問題。

Final stage：今まで学習した内容を総合的に確認する問題 (図 3)。

2.4 アンケート内容

教材の教育効果を評価するために、Google Form を使用してアンケート調査を実施した。アンケート内容には、性別、使用端末、完遂度、教材の難易度、操作性、医療画像の大きさが適切か、教材の分量、実行時間、全体的な満足度、医学英語能力の向上、医療画像読影力の向上が含まれる (表 1)。



図 2. ゲームマップ

ファイナルステージ

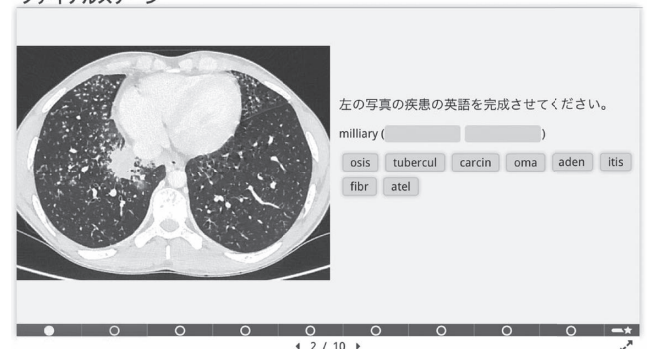


図 3. ステージ画面 (ファイナルステージ)

表 1. アンケート内容

質問項目		評価基準
属性	性別	男性/女性
	使用端末	スマホ/タブレット/パソコン
	教材を最後まで行ったか	はい/いいえ
説明変数	教材の難易度	1 (容易すぎる) - 5 (難しすぎる)
	操作性	1 (非常に満足) - 5 (非常に不満)
	医療画像の大きさ	1 (非常に満足) - 5 (非常に不満)
	教材の分量	1 (多すぎる) - 5 (少なすぎる)
	実行時間	1 (5分未満) 2 (5分以上 10分未満) 3 (10分以上 15分未満) 4 (15分以上 20分未満) 5 (20分以上 25分未満) 6 (25分以上)
目的変数	教材の満足度	1 (非常に満足) - 5 (非常に不満)
	医学英語の能力が向上したか	1 (かなり向上した) - 5 (変わらない)
	医療画像を読む力が向上したか	1 (かなり向上した) - 5 (変わらない)

2.5 統計解析方法

ウィルコクソン順位和検定³：

属性に基づくグループ間の差異の有意性を判断するために使用した。両側検定を行った。有意水準は5%である。

ヒートマップ⁴：

説明変数と目的変数の相関係数を比較して視覚化したものである。

重回帰分析⁵：

目的変数に対して説明変数の寄与の度合いを調べるために用いた。

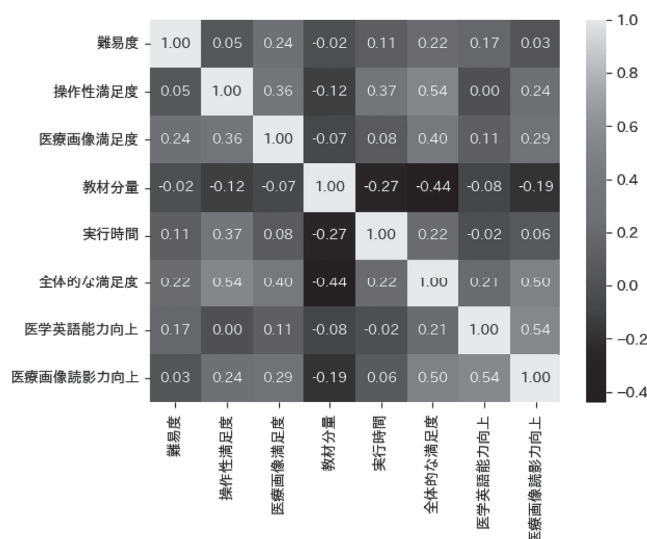


図 4. ヒートマップ結果

3. 結 果

3.1 アンケート結果

3.1.1 アンケート参加者の情報 [属性]

35名が参加していた（性別：男性20名，女性15名）。そのうち，多くの参加者がタブレットやスマートフォンを使用しており，教材を最後まで行った人は57.1%を占めた。

3.1.2 教材の内容に関して [説明変数]

大半の回答者が教材内容を普通またはやや難しいと答え，操作性に関してはやや不満に思っている人が多かった。実行時間においては15分以上20分未満と答えた人が多かったが，医療画像の大きさに大変満足しており，教材の分量に関しても適切であるという意見が多かった。

3.1.3 満足度・学習目標に関して [目的変数]

大半の回答者が満足していると評価し，自己の医学英語能力および医療画像読影力の向上を実感した。

3.2 解 析

ウィルコクソンの順位和検定では，ゲームの完遂度と実行時間に有意差が認められた。 $(p=0.021)$ 性別や使用端末といった属性は結果に影響しなかった。ヒートマップでは，相関係数が大きいものは操作性満足度と全体的な満足度(0.54)，医療画像満足度と全体的な満足度(0.40)，教材分量と全体的な満足度(0.44)となった(図4)。重回帰分析では $R^2=0.51$ であり全体的な満足度に関しては説明性が示された(図5)。

3. 考 察

統計検定の結果，ゲームの完遂度と実行時間に有意差が認められた。しかしこれは，完遂した結果として実行時間が長くなったという当然の結果と言える。回帰分析にお

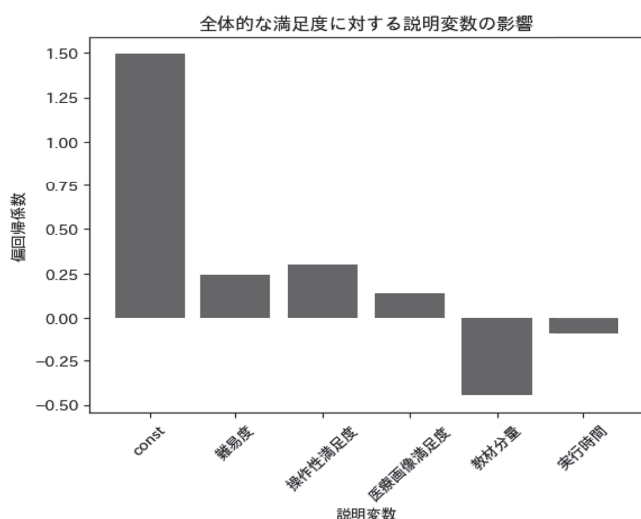


図 5. 全体的な満足度に対する説明変数の影響

る変数の比較から、満足度を高める条件として、教材の分量が多いこと、操作性が良いこと、難易度が高いことが明らかになった。したがって、満足度向上のためには、これらの説明変数を適切に調整するといった H5P アプリ自体の内容改善が有効であると考えられる。一方、医療画像の読影力向上および医学英語の能力向上に関しては、適切な回帰モデルを構築することができなかった。この原因として、教育効果に関して不適切な説明変数が使用されていた可能性や、適切な回帰方法が選択されていなかった可能性が考えられる。具体的には、線形モデルではなく非線形モデルの利用が適している可能性がある。多くの項目で有意差が認められなかったことについては、アンケート回答数が十分でなかったことがその要因として推測される。さらに、教育効果の評価に関しては、主観的なアンケートよりも客観的な教材のアクティビティログを説明変数として利用することが、より適切であった可能性がある。

4. 結 論

本研究では、医学生の医学英語能力向上を目的としたイ

ンタラクティブな e ラーニング教材を開発し、その効果を評価した。結果として、開発した教材が学習者の満足度と学習意欲を高める可能性が示唆された。特に、教材の分量、操作性、難易度が適切に調整されることで、全体的な満足度が向上する傾向が見られた。しかしながら、医療画像の読影力や医学英語能力の具体的な向上については、明確な結論を導き出すことができなかった。これは評価方法や分析手法に改善の余地があることを示している。今後の課題として、客観的な指標を用いた評価方法の導入、より適切な統計モデルの適用、そしてアンケートに基づく教材の改善が挙げられる。本研究は、医学英語教育における e ラーニング教材の可能性を示すと同時に、その効果を科学的に評価する上での課題も明らかにした。これらの知見は、より効果的な医学英語教育プログラムの開発につながる可能性がある。さらに、この研究アプローチは他の専門分野の教育にも応用できる可能性があり、教育工学と医学英語教育の融合による新たな学習方法の開発は、今後の医学教育の発展に寄与することが期待される。

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