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English for radiology residency: Challenges and technology-based assistance

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Abstract

This article tried to shed some light on how a radiology resident experienced challenges in using English during his study. Employing narrative inquiry, the data were collected from semi-structured interviews with a radiology resident currently studying at a state university in Indonesia. Meaningful experiences and insights were highlighted and elaborated. They were also discussed and corresponded with previous studies or existing theories. Understanding English textbooks with unfamiliar words made him spend a longer time understanding English written materials. He was also required to publish articles in reputable journals and present papers in scientific forums. Meanwhile, he didn't have enough time due to his busy schedule at the hospital. He pointed out that basic English might help in the beginning, but once it got into the specialty field of radiology there were many new terms to learn. Besides, willingness to learn English with fellow residents and from supporting tools were essential for success. He found some online tools very beneficial to make his work much easier and faster. However, those tools were still limited in some aspects and face-to-face learning activity was still needed. It implies the need for ESP learning design for busy residents which accommodates digital tools optimization and practical academic purposes.

Keywords: Digital tools; ESP; radiology resident

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1. Introduction

English language tends to become the prominent language of knowledge transfer in any field of study, including medicine. English language is needed by doctors during their academic studies and in their professional settings (Lodhi et al., 2018). During the academic study, English references, such as books, magazines, and journals are widely used in medical faculties in Indonesia and it sometimes causes problems or longer duration for medical students to comprehend English literature especially when they don't have sufficient English proficiency or when they don't have learning strategies to deal with it. In professional settings, doctors still need English to keep up with the advancement in global medicine and to deliver knowledge, especially in the global community context. It has been reported in a previous study by Lodhi et al. (2018) that there was a gap between the desired competencies with their actual level of English proficiency and they were not trained well to develop effective communication skills.

This gap can be caused by the lack of some of the basic skills, especially speaking and listening skills (Ibrahim, 2020), limited vocabulary mastery (Rushwan, 2017), and inappropriate English courses provided by the institutions (Choi, 2021). Those factors together with inappropriate support from the institutions result in learning problems. To a certain extent, medical students have carried out several strategies to cope with the condition. In dealing with linguistic factors, medical students usually do several strategies, such as using online translation machines and online learning tools (Alizadeh, 2018). Medical students found that translation machines gave them many benefits such as providing the translated version of the learning materials in a relatively short time and equipping them with an easy-to-use application using personal computers or mobile phones. Moreover, it also improves their motivation and reduces their anxiety about English texts (Tsai & Liao, 2021). In general, learning using information and communication technology (ICT) tools, such as translation machines for mediating knowledge transfer and communication, seems to bring benefits for them, even though somehow it could be misleading because of the inaccuracy of the mother tongue and the numerous equivalents of a word (Arani, 2004). For example, an online translation machine, Google Translate, was reported to have 57.7% accuracy in translating medical phrases, and thus, cannot be fully trusted. However, it was easily available and could provide initial knowledge (Patil & Davies, 2014).

Regarding the second factor of institutional support, it has been reported that English was often taught as a non-credit course to medical students during their entire academic career (Lodhi et al., 2018). This is quite contradictory because they use the language excessively during the study process. However, English for medical students is different from general English teaching content. To optimally reach the goal, a need analysis must be performed to provide appropriate learning content. Unlike general English, medical

students need the practice authentic material practices (Innocent, 2017) and functional language skills (Marcu, 2020). Further, Lodhi et al. (2018) explain that the aim of learning English for medical students is focused on language use in medical studies, information about medical discourse, and registers rather than learning grammar and primary structures. Meanwhile, it has been reported that medical English course books in use are mostly addressing the needs of students in an ESL (English as a Second Language) context (Kayaoğlu & Akbaş, 2016), which doesn't seem to fit the requirements as have been elaborated by those previous studies.

Moreover, four basic skills of the English language are also needed by medical students, including listening, speaking, reading, and writing. They need to be able to speak to the public and discuss medical issues in conferences or for conversational purposes. It will also be an essential skill when they are interacting with medical experts or patients who speak English (Patil & Davies, 2014). Besides, the ability in listening to medical audio, video sources, and oral presentations is also a significant skill that contributes to their understanding of the learning materials. Reading medical books, articles and manuals is most important as well as writing articles, projects, and taking notes (Kayaoğlu & Akbaş, 2016).

Medicine is such a huge home with many subspecialties inside, such as internal medicine, surgery, pediatrics, neurology, cardiology, dermato-venerology, psychiatry, orthopedics, pulmonology, etc. Medical students who have done their education and become general practitioners can choose to take one of the specialties. Medical students in this stage are called a resident. Those medical specialties must have different characteristics which require different English needs. One of the specialties in medicine is radiology in which the medical students who take radiology program are trained to be a radiologist with exceptional competencies in reading and interpreting images of radiology modalities such as X-ray, MRI, Ct Scan, and USG (Sosna et al., 2021). This department doesn't directly contact with the patients nor give them treatments, but it provides detailed descriptions and interpretation of the medical imaging which lead to the diagnosis of illness. Therefore, this department plays a vital role in other departments/ specialties.

Students in a radiology department are required to read and analyze medical imaging a lot. To be able to read and interpret the imaging, they learn from many sources, including those written and delivered in English (Juarez, 2011). For comprehending the learning materials, they need a longer time due to unfamiliar words. It can cause a misleading understanding of the text which will bring a fatal effect on their work. They also access many English learning videos as their learning resources, in which various English accents sometimes become a problem. Their writing and speaking skills are challenged in scientific events in which they are supposed to publish articles or do an oral presentation in English.

Shortly speaking, although they live and study in Indonesia, they required English skills for many purposes.

The learning process of a resident is different from general practitioner education. They study in a hospital context. They are learning in a real working situation as a radiologist (under supervision from their seniors) with limited time allotment for theoretical lectures. Therefore, they are often learning while working or working while learning. Under these circumstances, they need effective strategies for improving their English as well as for finding ways to solve their English problems efficiently. The use of technology and learner autonomy are two key issues in supporting their learning process (Alizadeh & Ebrahimi, 2019).

Learning journey and struggles are personal experience which is influenced by many factors, such as learning objectives, needs, learning styles, learning resources, time allotment, etc. This article focuses on investigating the challenges faced by a radiology resident dealing with English use and his strategies to solve those challenges by utilizing technology assistance. His practices revealed several implications of facts, challenges, and learning hacks to cope with English difficulties.

2. Method

Narrative inquiry was utilized in this study to gain meanings and insights from someone's learning and lived experience (Barkhuizen et al., 2014). The data was collected by semi-structured interviews with a radiology resident using an interview protocol to elicit comprehensive information about his learning journeys. The semi-structured interview was then followed by several informal interviews to confirm the findings and seek further details. For trustworthy purposes, the interview transcript was sent to the participant to be confirmed. The radiology resident has passed 5 semesters of the learning process at a radiology department in Indonesia. He has obtained a TOEFL ITP score of 510 and he doesn't speak English in daily communication. Furthermore, he has confirmed his willingness to be the participant in this study.

The data were analyzed thematically based on the research focus. Thematic analysis was used to identify common themes, patterns, and ideas from the data (Creswell, 2014). The findings of meaningful points during his learning journey were highlighted and elaborated. Several quotes from the interviews were also presented in the results and discussion section. The implications from the findings were utilized to recommend several suggestions for the stakeholders in providing appropriate English programs for residents. Finally, a conclusion was drawn based on the findings.

3. Finding and Discussion

3.1. English challenges for radiology residents

This section of the English challenges for radiology residents is divided into two themes. The first theme focuses on receptive skills of reading and listening which contribute more on the learning process in comprehending the materials from various sources. Meanwhile, the second theme is about productive skills of speaking and writing which are used in certain occasions during the residency, such as conferences and scientific competitions in radiology which are regularly conducted at regional or national levels.

3.1.1. Reading and listening skills

Of the two themes, receptive skills of reading and listening to radiology materials delivered in English are more crucial for learning activity since it contributes to their understanding which eventually can influence the expertise quality of medical imaging. Misleading in understanding the reference books and journals or comprehending the materials delivered in English-spoken lectures may results in lack understanding and invalid expertise. Meanwhile, medical residents generally don't have quite spare time for study since residency education involved a tight hospital schedule, daily cases presentation, and other academic tasks that the residents are unable to learn English intensively during their studies (Fenton, 2019), in which English plays an essential role in their learning process. Therefore, they need to address the challenges and adapt to the learning environment to find the most appropriate strategies.

This problem has been recognized and well-addressed by the department since one of the requirements of the student's enrollment was a certain minimal TOEFL score and oral English test to see the candidates' English proficiency. English has been considered one of the requirements to pass the entrance examination for specialization in many countries (Lodhi et al., 2018). The participant of this study holds a 510 TOEFL score and which brought him to pass the administration selection process but still had another English section in the interview stage. The participant shared his experience in the interview process in which he was asked to perform his English skill.

> "*This department has told us that we need good English competence. In the interview, one of the selection processes, I was asked to read loudly several paragraphs of an English journal and re-explain the content in English. I think it signaled that we might use English a lot during the education process."* (Interview, the participant)

This selection process covered both reading and speaking skills of English as explained by the participant. However, it didn't reflect the candidates' ability of listening and writing skills. Hence, it only took partial proficiency in the language. The listening skill might be reflected in the TOEFL score, but there was no evidence of the candidate's writing skill performance.

Even though the selected candidates were considered to have good English proficiency in reading and speaking skills the research participant explained that he still needed more time to understand the materials he was reading, especially when he found unfamiliar words. Here, vocabulary mastery is still becoming the cause of the problem. Often, he should confirm and discuss with seniors or peer residents to avoid misunderstanding learning materials from English sources or it might cause misinterpretation of the imaging he read. The participant shared the moment when he misunderstood the source he had read and it resulted in making mistake in interpreting the imaging.

> "*I was once reminded by my senior since she taught that I did a mistake in making the expertise. When we discussed it, she pointed out that I had been misled in understanding the resource book. She asked me to read it again and find the meaning of the difficult words and yaa I found that I made a mistake in interpreting what I read. Since then, I tried to be more careful in reading the materials*." (Interview, the participant)

The statement above implies the importance of discussion with fellow residents to confirm their understanding and/or to conduct a series of lectures to get a direct explanation from the senior radiologists. However, the busy schedule and hospital service made it uneasy to have such intensive lectures.

Another implication of this problem is that even though the resident had previously completed his general practitioner education and conveyed quite good English proficiency results, it didn't guarantee that it would be easy for him to comprehend any medical texts. This is because students at different levels do not have the same English needs and general English proficiency was not entirely enough when it came to more specific purposes. Besides, the English needed by a radiology resident indicates the need for professional purposes (Adulruman, 2007), and thus, English for specific purposes tend to be more appropriate for them (Prior, 2012).

In listening practice, the participant confirmed that he sometimes found it difficult to catch the talks from guest lectures that were delivered in English. In this case, the participant did perform his listening ability without the help of subtitles and he couldn't ask the presenters to repeat the talks. Somehow, he found the PowerPoint slides quite helpful to understand the materials thoroughly.

> "*Yes sometimes, when we have a guest lecture, I found it difficult for the first time. But it get better when I come to higher semester and have already joined several guest lectures in English*". (Interview, the participant)

It happened when they joined direct offline guest lectures during international seminars or workshops.

These findings confirm the importance of reading and listening skills to comprehend learning materials from a lot of English literature. Since radiology residents don't likely to interact with patients, listening and reading were considered important skills to be mastered (Kayaoğlu & Akbaş, 2016), while speaking isn't prominent during the learning process. It is also because the interaction with other professional in the hospital doesn't require them to speak English. It is also suggested that in developing their English reading skill, medical students need the role of practitioners to facilitate their learning, creating interactive and collaborative learning environment (ÿelik & Topkaya, 2016). However, the learning enviromnent in radiology residency might not support for having this kind of learning, and therefore, coordination of the stakeholders is urgently needed. On the other hand, the listening skill is well assisted by the the technlogy which provides the subtitle of the spoken English, but it would eventually come to the same problem if they are lack of vocabulary mastery. These two skills are closely related each other.

Basic English skill and medical knowledge a resident got from the previous education level are helpful for comprehending general topics, but they still need adaptation when it comes to specialty of radiology since there are many new and specific terms he didn't quite familiar with before. Lodhi et al. (2018) reported in his study that more than half of the responded didn't have adequate proficiency in listening, reading, vocabulary, and grammar. It also occured in this current study. It implies that basic English proficincy still need enhancement when it comes to specialties.

3.1.2. Speaking and writing skills

The productive skills of speaking and writing were also required during their education process. Since this is in the Indonesian context, the resident didn't use it in daily communication context, for example, to make expertise or interaction among residents and senior staffs. However, on certain occasions like seminars, symposiums, paper/poster competitions, and workshops, he was supposed to become the presenter, moderator, or master of a ceremony that required him to speak English. He shared his experience in using spoken English on several occasions.

> "*Yaa it's only for certain occasions like when we have guest lectures from Japan or Singapore, or when I present a paper in a scientific meeting. I think I don't get a problem with it since I have a quite good speaking ability. I also had become an MC in some international events when I was studying at the undergraduate level. But, because I don't well-trained and I don't use to speak English in daily communication, I am still afraid of making mistakes in grammar and pronunciation, mainly the grammar"* (Interview, the participant)

The statement above implies that prior knowledge, academic record, and experience are helpful in, at least, building confidence in using the language as experienced by the

respondent (Mulualem et al., 2022). However, this is not enough to hinder the speaker from speaking anxiety sourced from grammar and pronunciation aspects. Therefore, he thought that still need to have a lot of practice to make his speaking performance better. Meanwhile, he reported that no activity in the department encouraged the residents to speak English unless the international scientific meetings and international lectures. Hence, it made the residents' spoken English didn't make progress.

When asked about difficulties in writing, he reported that writing scientific articles in radiology was only difficult at first when he had not been familiar with radiology papers. Since then, along with his involvement in the department, he could recognize the language styles of radiology papers and he got many insights into writing through the reading process, so these two skills are interrelated.

> "*It was difficult at first since I don't have any ideas about what to write and how to write. My senior residents mostly helped me to comply with these difficulties.....it is also the result of the reading process. We have to present several articles each semester, so ya...when I read the journal, I know the way to write papers in radiology. But, ya the grammar always makes me afraid*". (Interview, the participant)

However, writing a scientific paper directly in English was still difficult for him, or very time-consuming. He used to utilize a translator service for helping him with English articles but spent too much expense on it. For addressing this problem, he once used Google translate to help him but it didn't much help and still need many revisions which eventually made it less efficient.

> *"I used Google translate. To some extent, it can be helpful, but it often contains inappropriate words and sometimes the sentences seem weird. I still need to recheck and revise, so I think I should look for any other solution".* (Interview, the participant)

It implies that using online tools can be both helpful and troublesome. Therefore, the user needs to know the characteristics, strengths, and weaknesses of the tools he uses.

Talking about speaking and writing skills, a previous study by Lodhi et al. (2018) has reported that over 60% of the respondent didn't occupy adequate skill of speaking and writing. The medical students encountered difficulties to speak English efficiently at seminars and conferences as well as making scientific article due to lack of English proficiency. As an integrated part of medical communication, English ability to take action in case conferences and medical congress presentation need to get attention (Ferguson, 2012) which involve both speaking and writing skills.

3.2. Strategies to tackle the challenges

This section is addressed to answer the second research questions on the strategies to tackle the challenges as performed by the participant. It is presented in two sub-themes. The findings are evaluated and compared to the previous studies.

3.2.1. Reading and listening

Fellow residents were the best learning partner from whom he could confirm his understanding as well as his expertise. Hence, the first strategy he did was to talk to his friends and senior residents about the new topics he read. In addition, radiology residents learned not only from books and journals but also from videos which were usually accessed through the YouTube application. He also at the first stages of residency tried to translate the English sources, such as books and journals, using the Google Drive application. To a certain extent, it was quite helpful but still, he needed to confirm and discuss the topic with fellow residents.

> "*So I am not only reading the research book or journals but also watch videos on YouTube to get a more comprehensive understanding."* (Interview, the participant)

Asking about learning from YouTube videos, the resident confirmed that it was much easier since now YouTube enabled helpful subtitles. Even though the talks were in English, they still could follow them well from the subtitle and they didn't worry about their listening skill. As he had reported before that YouTube videos were helpful for his learning purpose.

> *"I think I don't have any problem with listening. Now YouTube has subtitles so It doesn't matter about the accent. Moreover, in videos there are illustrations, moving pictures, or graphics that are helpful to get a better understanding*." (Interview, the participant)

Meanwhile, for online guest lectures using online meeting platforms, such as Zoom, it has already enabled English subtitles and it could assist users across language boundaries. This internet-assisted interaction could facilitate the residents to follow the lectures without being worried about the English talks.

Despite the need of face-to-face discussion with fellow residents, the findings imply that the technology has assisted the resident to obtain a better understanding, like what is provided by Google Drive with its translation tools and YouTube. Both belong to mobile learning technology which can be accessed anytime and anywhere. The help of mobile learning technology has been reported to significantly improve behavioral, social, cognitive, and emotional engagements (Yu et al., 2022). It can be observed from the findings that the mobile technology help him by providing the fast translation and subtitle that make him less worry in the learning process. Moreover, a previous study has reported that medical students tend to expect their teacher to translate English medical literature to

their spoken language (Sojoodizadeh et al., 2020), and these days technology has made it easy.

3.2.2. Speaking and Writing

For the speaking practice, the resident reported that he always had some rehearsal before performing and he learned from several YouTube videos as well.

> "*I usually practice at home or in front of my friends and they correct me or give some suggestions. I also watch on YouTube some videos of how an MC or a moderator performs. I notice their words and use them*." (Interview, the participant)

He found that not all residents were willing to be the learning partners since not all of them have adequate spoken English skills; only two or three of them had excellent spoken English skills. From these findings, it can be seen that YouTube has become a huge learning source for many purposes (Hendriwanto et al., 2021). The participants reported that YouTube had been supporting them in practicing several skills, such as listening, speaking, and pronunciation (Hendriwanto et al., 2021; Rachmawati & Cahyani, 2020). However, a face-to-face learning experience as he performed with his friends to have rehearsal and discussion is still very needed (Kayaoğlu & Akbaş, 2016).

It provides unlimited videos for various fields of study. The thing that should be highlighted in using YouTube is about choosing the right learning sources that present valid information and model (I. Alizadeh & Ebrahimi, 2019). It still required basic knowledge from the users about what he is looking for. Besides, choosing trusted channels is also important, such as the official university channels. Another way, recognizing the experts in the field bringing the user directly to the reliable videos he needed. Without clear objectives and background knowledge, searching materials on YouTube can also be time-consuming and confusing due to the abundant sources.

Meanwhile, for helping him with English writing, online translation tools also became the main solution for the resident as well as medical students in general (Sojoodizadeh et al., 2020). Finding that Google translate didn't help, he reported that Google drive performed better.

> "*When I was in my first semester, we are asked to translate a reference book of more than one thousand pages. You know, we paid a translator and it cost a lot of money. Until then we know that Google drive can do translation with very good quality. It turned out to be very very good news for us. After that, we never use a translator service anymore."* (Interview, the participant)

Google Drive, through its Google Docs feature, had a translation tool that can translate a document in a single click. It appears to be a very helpful, effective, and efficient tool for him. It can also detect errors in the writing mechanics which is very helpful for

proofreading purposes (Ebadi & Rahimi, 2017). In addition, it was time-saving and the translation quality is very good.

> *"I couldn't believe that the translation result is very good. The word choices are also appropriate. I often use it to translate my paper or sometimes translate an English journal. Of course, we need to proofread it but I don't do many corrections. Maybe there are other tools on Google drive that I haven't explored but having the translation tool is enough for me."* (Interview, the participant)

It can be derived from the findings that the radiology resident felt enough with those solutions of using YouTube and Google drive features. It implied that the resident has already known what he need and how to find the solution to his problem. This kind of condition may be very individual since everyone has their preference in learning style, background knowledge, and preference (Quadir et al., 2022), but knowing the considered highly effective and efficient tools to overcome English difficulties need to be told to others to bring wider effects. What is needed to do is how to organize these findings and formulate them into an applicable implementation which can facilitate the residents in using English properly and effectively (Hari et al., 2021).

3.2. Strategies to tackle the challenges

There are several implications derived from the findings. Firstly, residents still need to improve their English especially to support their professional responsibility, in this case dealing with understanding the learning resources and being able to present their ideas as well as research results either written or orally. Therefore, the learning activities for the English class of radiology residents need to be designed to meet these objectives. The learning activities should be specialized into certain domains and figure out work on certain academic fields (Prior, 2012) and be meaning-focused (Carrasco-Flores & Alcaraz-Mármol, 2021).

Amidst the limited time allotment and heavy workload, having a straight-to-the-points learning activity will be helpful. The appropriate learning methodology should be promoted for this condition (Hari et al., 2021; ÿelik & Topkaya, 2016). Moreover, radiology residents in general have got a standardized English ability, so they don't learn from the basics. Even though technology has provided many things, face-to-face language classes are still needed and they are often more desirable (Kayaoğlu & Akbaş, 2016), and therefore, medical education institutions can consider providing in-class English courses based on the academic field of study.

Secondly, the rapid enhancement in technology and artificial intelligence-based applications can assist the residents in writing skills as well as other skills, improving behavioral, social, cognitive, and emotional engagements in learning (Quadir et al., 2022; Yu et al., 2022). While it is reported that having translation tools can be a solution, many

others applications can help to generate writing products in more effective ways. It can be considered to help the residents work more efficiently. To promote the use of technology in language learning, it is important to first raise motivation for and confidence in using technology (Alizadeh & Ebrahimi, 2019). In addition, campus resources and technology should be side by side with self-learning strategies to ensure optimal learning outcomes (Shorey et al., 2021).

4. Conclusion

Becoming a part of a radiology department as a resident means that someone needs to read and analyze a lot to be able to provide valid expertise in medical imaging. Many of the learning resources are in English. As a non-native speaker, a radiology resident often finds difficulties sourced from a lack of vocabulary mastery. To confirm the comprehensive understanding, discussion and direct lectures from senior radiologists are still needed. English is also essential to deliver ideas at scientific events. In those conditions, the technology has assisted in better understanding and performance. It then implied the need for an English course that focuses on the need to comprehend resource books effectively and to present ideas in a better way. The inclusion of technology using AI applications will be helpful.

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