

Effect of Pre-Lecture Medical Terminology Guidance on Students' Academic Achievement and Class Participation

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Abstract

Comprehending English medical terms represents a major obstacle for medical students, especially the none-native English speaking learners that might lead some of them to failure sometimes. This study was intended to examine the usefulness of a "pre-lecture medical terminology guide" in improving those students' academic achievement and class participation during their study of a physiotherapy course. A two-cycle approach of intervention was followed implementing a written pre-lecture guide in the first cycle, and a written pre-lecture guide with a 5-minute explanatory lecture in the second cycle. The obtained results showed a slight improvement in students' scoring in the first cycle, but a significant one during the second cycle. In addition, the findings revealed students' preference of pre-lecture medical terminology guide with a 5-minute explanatory lecture as an effective teaching method for them to understand the medical terms in English. The students also showed a positive feedback towards the pre-lecture guide and felt it helped them understand and memorize difficult medical vocabulary more easily. They also believed that the same technique should be used with other physiotherapy classes.

Keywords: None-native English-speaking learners, English for specific purposes, pre-post lecture guide, academic achievement

1. Introduction

As it is the fact in almost all sciences, the English language has a strong presence in the academic studies, especially the medical field. For example, Musacchio (2012) emphasizes that even though most medical practitioners in Italy study medicine in Italy, their medical world has been dominated by English based medical knowledge. The study reports that at least two out of five medical Italian journals accept only English-based medical articles. On the other hand, it is well known that studying medical courses is considered hard particularly for none-English speaking learners since more medical programs are offered in English which requires the students to challenge both; learning the condensed subject content and developing the target foreign language skills. Unfortunately, this has been the situation of the Arab students in many Arab countries, who were accustomed to studying in their native language (Arabic) along their formal education till they finish their high school but once they join the university, especially the medical programs such as Physiotherapy B.Sc. program in the context of this study, they find themselves challenged to switch to studying and learning in English. To overcome this problem and in order to support students in their learning using the foreign language, the current study was conducted and followed the action research design as this design is believed that it best suits the purpose of this study. According to Mertler (2006), action research is a successful method to achieve change and improvement in a practitioner's own teaching as well as students' achievement. also, implementing English medical terminology guide to support students learning can be perceived as a response to the professional responsibility which the academic practitioner has towards his or her student and this can be achieved through action research as well. Zuber-Skerrit (2013) explains this that faculty's accountability to their academic practice can be increased and better performed through action research.

2. Literature Review

The problem of transferring from studying in the mother tongue to studying in the foreign language, that is English, in the healthcare field has been a well-documented problem of university students all over the world. Choi (2005) did a literature review concerning issues surrounding education of English-as-a-Second Language (ESL) for nursing

students and suggests that nursing programs should face major modifications in order to provide the required level of suitable English proficiency for English based nursing education to overcome the challenge that non-native English speaking learners might face during their study of nursing. In addition, Olson (2012) reported that among many variables that could hinder the educational success for non-native English speaking nursing students in China, language barrier was the most significant barrier. In the Arab world, similar results have been reported. Telmesani et al. (2012) reported that medical colleges in Saudi Arabia usually enroll the top high school graduates. However, a marked percentage of them drop out mainly due to linguistic difficulties.

This situation has urged researchers and practitioners to explore problem and try to find solutions. For instance, Gurpeet Dahliwal (2009) emphasized that teaching medical courses to non-native English speakers could lead educators to pursue more creative and culturally accepted methods of teaching. According to his personal experience in teaching Japanese medical staff, as an educator to non-native English speakers, must consider dissimilar linguistic, cultural, and academic backgrounds of the learners. Hull et al. (2004) explained why duplicating medical programs from western universities to English as a second language speaking countries require adjustments. She emphasized that traditional medical university requirements included an internationally acclaimed English competency test. However, most of these tests focus on language structure and grammar, while the main difficulty of non-native English speaking medical students face is the acquisition of medical terminology. Therefore, Hull et al. (2004) suggested that university curriculum should focus on medical terminology acquisition as a primary objective, while grammatical structure should come secondary for non-native English speaking medical students.

Some universities such as Des Moines University offer medical terminology courses to cover the students' lack of English medical terminology as part of the solution in this regard. A novel technique for memorizing and understanding medical terminology was introduced by Davis Viera (2012). He used a method named the "keyword system" to facilitate memorizing difficult medical terms. In this method, the researcher suggests that learning any medical terminology should be correlated with something else, such as word rhythm, meaning, or an image. According to Davis Viera (2012), the more the learners can correlate the more they have "keywords" helping them memorize.

Based on the above and considering the context which this study was conducted in, a re-evaluation of the current teaching practice in a physiotherapy course was done in order to facilitate comprehension and memorization of English medical terminology for some students who were taking their first physiotherapy course in English. To achieve this aim, a "Pre-Lecture Medical Terminology Guide" was designed and implemented. This technique is similar to the "Keywords System" suggested by Davis Veira (2012) as it correlates between the medical term, its medical word roots, and its meaning since it was believed it would have the potential to simplify medical terms to the Arab students.

3. Methods

3.1 Research Question and Methodology

To achieve the above aim, the study attempted to answer the following main question:

- *How effectively can pre-lecture medical terminology guidance improve the amount of students' academic achievement and class participation?*

This question was answered through following the action research design. According to Metler (2014), action research is a successful method to achieve change and improvement in a practitioner's own teaching and can be conducted using a cycle of change in the current academic practice with main variable for intervention and another interfering variable for development of the practice. This was done in this study through applying a new teaching technique (pre-lecture medical terminology guide) and investigating its efficiency in improving the students' academic achievement and engagement in a physiotherapy course. The data collection was performed in three periods: traditional education to represent the students' current level of achievement and participation before the conducting the proposed intervention, a conduction of cycle 1 (use of written pre-lecture medical terminology guide), followed by cycle 2 (using written pre-lecture guidance for medical terms with support of a mini lecture). The three cycles consisted of 2 lectures and lasted for two weeks. To ensure full control on this conduction, the three cycles were performed during the teaching of a specific unit, namely "Manual Muscle Testing", which usually includes explanations about muscles then performing the related testing. The study participants did not have problems performing the testing, yet they showed having difficulties remembering and correlating each test with its respective muscle. More explanation about the conducted cycles is stated below:

3.1.1 Current cycle of practice

This cycle represented the normal traditional teaching practice that was conducted to students. It consisted of delivering brief explanations about the tested muscles then immediately demonstrating the testing techniques. The explanation included details about the concerned muscle such as origin, insertion, innervation, and action.

3.1.2 Cycle 1: Utilization of pre-lecture medical terminology guide

This cycle represented the main intervention that was done in the target practice which consisted of providing students with a written pre-lecture medical terminology guide (appendix I) with all the muscles described in before start of the target lecture. Students were also given five minutes to read the guide. The pre-lecture guide (appendix I) includes the name of the muscle, word root breaks down, and explanation of what the muscle name means. After practicing the pre-lecture guide with students, the rest of the lecture was performed as it was used to be.

3.1.3 Cycle 2: Utilizing pre-lecture medical terminology guide with supporting mini lecture

Similar to what was done in cycle 1, each student in cycle 2 received his/her written pre-lecture medical terminology guide. However, instead of asking students to read the guide, they were provided with an explanation of all the muscles, their word roots, and meanings. Then, the same traditional session was resumed.

3.2 Instruments

3.2.1 Design of “Medical Terminology Guide”

A pre-lecture medical terminology guide was designed and developed to improve students’ acquisition and comprehension of difficult medical vocabulary. The terminology guide (appendix I) was presented in a form of a table representing the medical word, its break-down of medical word roots, and its medical meaning.

As what Davis Viera (2012) explained in the “keyword system” method, correlation and making up “keywords” will ease memorizing medical vocabulary. Hence, the pre-lecture medical terminology guide adapted a similar point of view by correlating between the medical terminologies, its word root, and meaning in order to be considerably easy to comprehend and memorize on the part of the study participants.

3.2.2 Quizzes

Quizzes were utilized in order to measure the changes in student academic achievement between traditional education, cycle 1, and cycle 2 (A3, K5).

The same type of questions (fill in the blank) was given during the three periods. In each quiz, the name of the muscle was given and the student was required to fill in a table with all the information related to the muscle including action, innervation, nerve root, origin and insertion. Quiz grade was out of 10.

3.2.3 Students’ participation

A modified class participation checklist was used to measure students’ participation during the application of the terminology guide. The checklist was adopted from the Toronto District School Board, Strategies and Tools for Planning, Assessment, and Evaluation (1999). (Appendix II). The participation checklist measures the amount of participation done by each student, and the type of this participation as well, such as answering questions, asking questions, giving feedback, and raising critical questions or comments.

Due to the difficulty in documenting all participation during the lecture, all lectures during the three periods (traditional practice, cycle 1, cycle 2) were video-taped so that students’ participation were measured and analyzed later. For ethical and professional purposes, all students who participated in this study were requested to sign a consent form regarding the video record.

3.2.4 The Questionnaire

By the end of cycle 2, the students were given a questionnaire to do about their experience while conducting the proposed practice ‘using the terminology guide’. The questionnaire consisted of ten questions and it covered issues related to how the students perceived the pre-lecture guide, how useful they found it, and if it should be used in other classes or not. The full questionnaire can be found in appendix III.

4. Results

The impact of the proposed study on the students’ performance was investigated through measuring the progress of their academic achievement by calculating the means and standard deviation of their performance in the given quizzes, while the development level of students’ participation was investigated through calculating the averages of

the classroom participation observation checklist. On the other hand, student perception of the pre-lecture guidance of medical terms was manifested through the questionnaire.

The analyzed results from the quizzes indicated a significant increase in students' progress of their comprehension of the studied medical terminologies during the conduction of the study. The obtained results showed that the average score for the students' achievement during the traditional practice period was almost close to the average standard norm ($M= 6.3/10 \pm 2.31$). However, this level was found slightly increased after exposing students to the first change in practice by implementing the designed medical terminology guide in cycle one as the mean ($M = 6.6 \pm 2.22$), whereas it was significantly increased in cycle two ($M =8.3 \pm 1.86$). A comparison of the students' performances across the three cycles is displayed in the following figure:

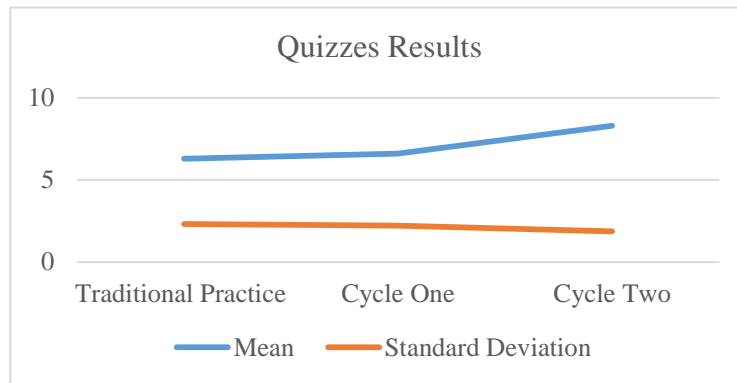


Figure 1. Average and standard deviation of the quiz results across the three stages of action

The finding illustrated in the above figure is supported also by the results analyzed from the observation checklists. Tremendous change in class participation was registered along with the change in the teaching style. According to the results, students showed an average level of participations reflected in 26 class activities and attempts of involvement, but these attempts increased during the implementation of the pre-lecture medical terminology guide to 38 attempts of involvement and engagement. More, these attempts of engagement into class participation increased to reach 62 participations, which represents 150% increase from their normal level registered in the first traditional teaching stage. The following figure illustrates this increase across the three stages of application:

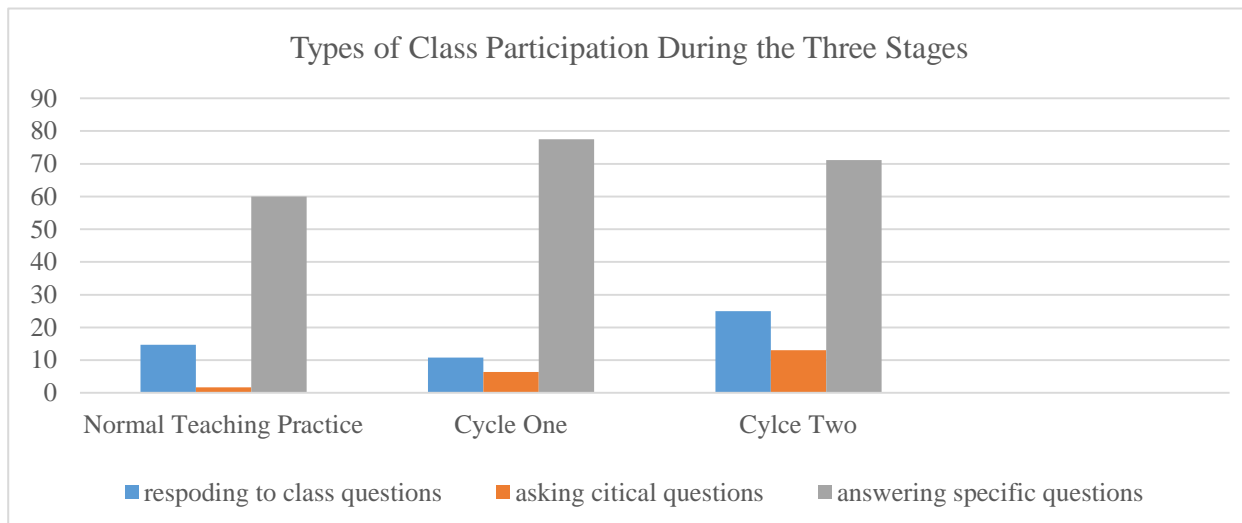


Figure 2. Percentages of participation types during traditional practice, cycle 1 & cycle 2

To support these two findings of the positive impact of the proposed strategy on facilitating the physiotherapy students' learning while using English as their medium of instruction, the participant students' perceptions were also sought through analyzing their responses to the given questionnaire. The results indicated that out of the eleven students, nine students responded to the questionnaire. All students stated positive comments about the pre-lecture medical terminology guide as a practice to facilitate their learning and study in English as a foreign language. They

believed that it assisted them to focus more on the target content during the as well as enabling them to easily comprehend and memorize the required medical terms. The students also recommended that the proposed technique should be applied in other physiotherapy courses. Generally, the results of the questionnaire show that participants agreed that pre-lecture terminology guidance with mini lecture that was practiced in cycle two was more beneficial to them than just reading the pre-lecture terminology which was practiced in cycle one. The following table displays students' responses to the questionnaire statements:

Table 1. Students' perceptions of the applied practice

No.	Statements	M	SD	Judgment
1	The Terminology Guidance helped me focusing on the class	4.68	1.60	High
2	The Terminology Guidance helped me understanding the lecture	4.88	1.87	High
3	The Terminology Guidance made memorizing difficult medical terms easier	4.89	1.88	High
4	I think the Terminology Guidance is a waste of time	1.46	0.98	Low
5	I feel more confident that I know the meaning of each medical word using the terminology guidance	3.61	1.53	Moderate
6	I think the lecturer should continue the same technique for all lectures	4.32	1.61	High
7	I think the lecturer should focus on using better material than using this technique	3.50	1.47	Moderate
8	I have positive view of the Terminology Guidance	3.36	1.23	Moderate
9	The Terminology Guidance needs a lot of improvement to become useful	3.43	1.39	Moderate
10	The Terminology Guidance is an extra burden	2.41	1.00	Low

5. Discussion

From the quizzes results, it is apparent that the proposed technique assisted in making an improvement on the students' learning. This was noticed through the slight improvement from the scores they gained in the traditional practice stage and in cycle two when the pre-lecture guide was implemented. Though this slight change in results cannot be used to generalize, it could act to play as an indicator that the applied technique is helpful. In addition, results obtained in cycle two showed significant improvement in students' achievement in their quizzes. This asserts the fact that the proposed practice can have more significant effects on students' performance if it was applied with minor variation such as giving students elaboration on the required terms. Hull *et. al* (2004) support this finding and justify that giving priority to medical terminology over other linguistic skills has tremendous effects on the students' level of achievement. In fact, this was exactly what was witnessed during the carry out of the study that students managed to overcome the language barrier they were challenging and started to utilize their subject content ability to approach the required content.

It is also interesting to notice that as the average of the students' score increased, the standard deviation decreased. Decrease in standard deviation is a direct indicator that the variation between the results decreased. Therefore, the academic achievement level between all students is getting close. It is a common objective for all educators to remove the obstacle that could lead to variation in students' performance. Biggs (2011) indicated that good teaching would prepare most students to be in the appropriate cognitive level required to achieve the educational outcomes. Therefore, it can be concluded that the pre-lecture medical terminology guide can be taken as an effective means for how a simple technique could decrease the linguistic difference between students and set them on a closer cognitive level.

Compared with academic achievement, improvement in class participation was much higher during cycle one and two. This increase in class participation indicates that the proposed technique successfully managed to shift the students' focus from what they receive from the instructor to involve themselves as active participants in the educational process. Biggs (2011) and (Race, 2013) reported that higher-class activity and engagement would result in reaching higher educational value, and intended learning outcomes since the learners will act as active participants than passive learners.

With regard to students' participation, the results revealed the effectiveness of the applied technique in this regard. A clear indication of this effectiveness can be seen in the change occurred on the level of the quality of students' participation and their role of engagement in the class activities. The results illustrated in table (1) indicate that 80% of class participation in the traditional practice reflects a passive role of the students since it was mostly limited to just answering the questions raised by the instructor with no critical thought or comments raised at this level.

Contradictory, the results of cycles one and two display a drastic shift of this trend in terms of the type of participation and how it was diverted to reflect more active role of the participant students through raising questions, critical comments or questions and giving positive comments. This asserts the fact that the applied technique managed to help students become more active and self-dependent. Consequently, it can also be claimed that the proposed practice helped students become more confident of themselves as second or foreign language learners in the sense that it broke the barrier of considering the foreign language as their main obstacle in their learning. The registered percentage of their critical questions in cycle two shows that they are not satisfied with the bare minimum level of education, but they are seeking deeper and more complex educational experiences.

However, it is evident that Although there was an increase in the quantity and quality of participation, the level of this active participation could have been higher but it was negatively influenced by a major factor that is culture. Out of 11 students, 10 students were females and one was male. As a contextual knowledge in the context of the present study, female students are generally shy and hesitant to participate in class activities. More, their cooperation among themselves will not be as harmonic as it should be if some of their classmates are from the other gender, even if it was a minority (n= one male).

6. Conclusion

To sum up, most students agreed that the implemented practice would be helpful if the pre-lecture was used in their other physiotherapy courses. This was reflected in their responses to the questionnaire statements. Dahliwal (2009) emphasized that a high concern should be given towards cultural and educational background factors while teaching medical subjects in English for non-native English speakers. In application, he reported that focusing on writing the material on the board was more effective in Japan, because he realized that Japanese focus and comprehend the written word better than spoken words. Therefore, it would not be surprising that all students agreed that they prefer having a pre-lecture medical terminology guide with a mini lecture. Most Arab students prefer listening and monitoring motion and gesture to reading (Rammal, 2009). It is very important to consider how different cultural and educational backgrounds could lead you to change your teaching style in order to attain more focus and a higher cognitive level from your students.

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