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Abstract

Purpose: Language competency has been perceived to be a significant barrier to both learning and interaction in university. However, most studies in this field confine themselves to perceptions of students. This study focused on actual behaviors in small group discussions. It explored whether linguistic differences affect the level of participation between students who conduct discussions in their native Arabic language and those who participate in a second language, being English.

Method: An experimental study conducted at a Saudi medical school. First-year medical students were assigned randomly to attend two small-group discussions either in Arabic or in English. All sessions were video-recorded for data transcription and analysis. The students' utterances were broken down into propositions and subsequently categorized as either explanatory or descriptive. The number of propositions for each student was counted for each group. Analysis of variance was conducted to test for differences. To examine students' perception toward conducting small-group discussions either in English or Arabic, students were invited to anonymously fill a questionnaire distributed at the end of the sessions.

Results: Students who were assigned to sessions conducted in their native language produced significant more descriptive ($p < 0.005$) and explanatory propositions ($p < 0.008$). Discussions conducted in their native language were almost 60% more extensive than those conducted in English. Although not significant, students reported that conducting the PBL tutorial session in the Arabic language made them more motivated and gave them more confidence in expressing their thoughts. However, when PBL is conducted in English, students indicated that their understanding of basic sciences is better ($p < 0.001$). In addition, they assume that they acquire a deeper knowledge.

Abbreviations: PBL, Problem Based Learning; GPA, Grade point average.

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Conclusion: Students' who use their native language in small-group discussions contribute more than those discuss matters using a foreign language. However, more students perceived that using the English language helps them better in understanding basic sciences and ensuring deeper knowledge.

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Keywords: Medical students; PBL; Participations; Languages

1. Introduction

Among the most effective strategies employed by teachers for enhancing student learning is group work or group discussions.^{1,2} This is because group work provides students with opportunities to collaborate and learn from each other by comparing and analyzing each other's thoughts, ideas, and perspectives. Although the teacher plays an important role in preparing the environment for successful group work, student participation and taking ownership of their own learning are considered imperative for student learning in group discussion.¹

The literature has identified a number of factors, as important considerations when assessing effectiveness of small groups, among them age, gender, prior educational experiences, and language.³ Language is central to the process of communication, and it allows a person to express emotions and feelings, share ideas and thoughts, and convey his or her views and opinions.^{4,5} As a byproduct of the rapid globalization of higher education, the English language has become the most widely used language for teaching and learning. Therefore, a student can hardly succeed if he or she is not proficient in that language. However, language competency, specifically English language competency, has been perceived to be a significant barrier to both learning and interaction and a key source of anxiety for students when they have to work with peers from diverse backgrounds in groups.⁶ In a learning environment where learning is dependent on the sharing of information, language can function as a barrier to personal interaction and academic understanding.⁷ Harrison and Peacock measured the students' perspective at two mid-ranked universities in the UK and found that those who did not have English as their first language feel uncomfortable speaking to native speakers of English and vice versa.⁶ Their study suggests that one of the reasons is that terms are sometimes understood differently. When conducting a project with fellow-students who lack appropriate language skills, communication

cannot be straightforward, thereby making group dynamics slower. Hence, language was identified as a significant barrier to participation in one's study.

A number of other studies have also focused on linguistic differences between students in a group. Most of them suggest that holding a discussion in a nonnative language leads student to avoid active participation, resulting in dysfunctional groups.^{8,9} On the other hand, Singaram, Dolmans and Lachman, studying a setting in which problem based learning (PBL) was used as medium of instruction, found, in a medical student population that was socially and culturally diverse, no relation between language differences and student participation.¹⁰ Contrary to the findings of the previously mentioned studies, this study found that those who had English as a second language felt more positive about the functionality and effectiveness of the group as compared to students having English as their first language.

Conclusions of the studies reviewed here were all based on *perceptions* of students involved in discussion groups as to how having to speak a second language influences participation. No studies exist in which *actual* participation was measured. It is possible that students, forced to speak a nonnative language feel inadequate (and express this in their responses to a questionnaire), while their actual behavior is less impeded than they perceive. The purpose of the present study was to fill this gap by an attempt to directly observe the effects of language on participation in small-group discussion. To that end, Saudi medical students, enrolled in a problem based curriculum were randomly assigned to either small groups discussing a problem in Arabic, or to groups discussing the same problem in English. Participation was measured by recording the ongoing discussion. These discussions were transcribed, and the number of descriptive and explanatory propositions were counted. In addition, a survey was administered inquiring about the students' experiences and opinions regarding the event.

2. Method

2.1. Study design and participant allocation

The present study aimed to explore whether linguistic differences affect the level of participation between students who conduct discussions in their native Arabic language and those who participate in a second language, being English. An experimental study was carried out in one of the Saudi colleges of medicine that applies problem based learning (PBL) as its instructional strategy. Ethical approval was obtained from King Abdullah International Medical Research Center to conduct this study (Ref. No. IRBC/1193/16).

Participants were first year male medical students who were already assigned randomly to 22 different PBL groups. For this study, eight groups out of the 22 were further selected through randomization. The selected groups were randomly assigned to sessions that are either conducted in Arabic only (the experimental group), or English only as the curriculum requires (the control group). Most of the PBL tutors were bilingual (Arabic and English). However, in the event that a tutor did not speak Arabic and was not able to facilitate the experimental Arabic sessions; the tutor was randomly replaced by another tutor who spoke Arabic for the purpose of data collection.

2.2. Procedure

A PBL cycle at the college consists of three meetings with a tutor. In the first PBL session (the brainstorming session), students are given a case, asked to formulate the problem and hypothesise using their prior knowledge before they come up with the learning objectives for next session. For data collection purposes, this session was chosen because it was hypothesised that participants will depend on their oral communication skills to discuss the case. The study took place in tutorial rooms that consisted of between 8 and 10 students and one tutor. Consent forms were collected from the students and the tutor before starting the session. A card displaying students' names was placed in front of each one to help identify their participation in the process.

The tutor in each group assigned a chairperson to introduce the case for discussion. In addition, a scribe was assigned to summarize the main points of the group discussion on a whiteboard and to order all the ideas that were raised during the session. Students were allowed sufficient time to read the case so they could start the discussion and propose their

explanations. The first author or an assistant researcher attended the sessions to observe the process without any interference. All sessions were video recorded for data transcription and analysis.

2.3. Measurements

2.3.1. Proposition analysis

All utterances of the students were transcribed and subsequently parsed into propositions. A proposition is usually a subject–verb combination that express a single idea. They can be identified in texts by conjunctions (as 'and', 'or' and 'for'), adverbs (as 'when' and 'whereby'), relative pronouns, periods, and semi-colons. Sometimes commas or parentheses also separate propositions from each other. The text parts between these linguistic markers can be considered propositions. For each proposition, it was decided whether it was a descriptive proposition or an attempt at explanation. An *explanatory* proposition was defined as a statement that either characterizes a process or describes the conditions under which this process occurs. All other propositions were considered *descriptive*.¹¹ Here is a sample of the utterances of a particular student (slashes mark boundaries):

Hypertension occurs in approximately 8–10% of pregnancies./Two blood pressure measurements greater than 140/90 mm Hg is considered diagnostic of hypertension in pregnancy./ High blood pressure in pregnancy can be classified as pre-existing hypertension/, gestational hypertension/ or pre-eclampsia. Pre-eclampsia is a serious condition/ of the second half of pregnancy/. It characterized by increased blood pressure and/ the presence of protein in the urine/. It occurs in about 5% of pregnancies/ It is responsible for approximately 16% of all maternal deaths globally/.

2.3.2. Student perception questionnaire

To examine students' perceptions toward conducting PBL in Arabic only or English only, students were invited to anonymously fill a questionnaire distributed at the end of the PBL sessions. The questionnaire consisted of 11 questions focusing on various aspects of conducting small-group discussions solely in Arabic or English. The items were scored using a 5-point Likert scale ranging from strongly disagree to strongly agree. Before piloting, face and content validity were performed to ensure items are measuring

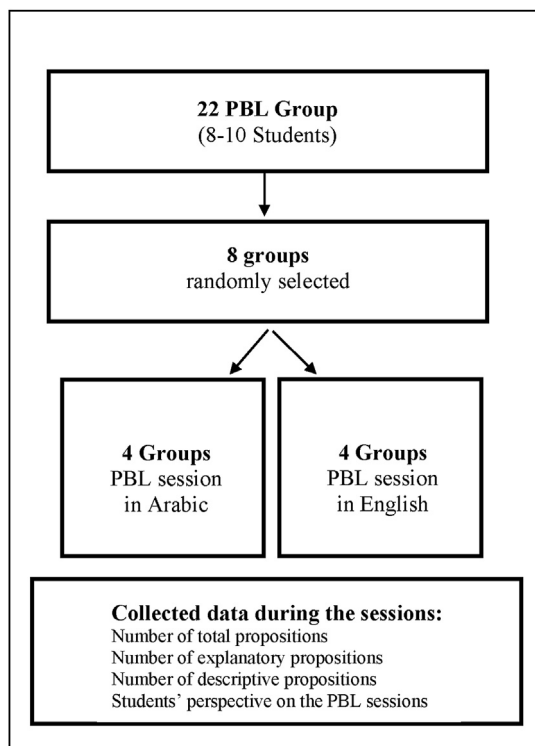


Fig. 1. Flowchart of the study.

exactly what they are supposed to. See Table 2 for the items. Fig. 1 is a flowchart of the design of the study.

2.4. Data management and analysis

The videotaped sessions were transcribed. The resulting protocols of each PBL session were parsed by the researcher into subject-predicate units (or propositions), each expressing a single idea. Frequencies of explanatory and descriptive propositions were counted for each student and each group. Statistical analysis was conducted using SPSS software program (version 22.0.0; SPSS Inc). Analysis of variance (ANOVA) was conducted to test for differences between the English-speaking and Arabic-speaking groups. A test was considered significant if the p -value ≤ 0.05 .

3. Results

Table 1 provides an overview of the mean number of propositions produced during all the conducted PBL sessions in both languages. The results of the ANOVA's were as follows: For the mean number of descriptive propositions: $F(8.6)$, $p < 0.005$, $\eta^2 = 0.109$. For the mean number of explanatory propositions: $F(7.33)$, $p = 0.008$, $\eta^2 = 0.095$. For the total number of explanatory propositions: $F(9.43)$, $p < 0.003$, $\eta^2 = 0.119$. These findings provide evidence for the facilitative effect of group discussion in one's own language. Students in groups conducted in Arabic produced on average almost 60% more utterances than students in groups conducted in nonnative English. The effect is particularly strong for explanatory propositions; the Arabic groups produced 76% more of such propositions. This suggests that the Arabic speaking students tried to find explanations for the problem presented to them to a much larger extent than the English speaking group. A third conclusion is that, generally, quite a large portion of discussion in these groups is spent on the exchange of descriptive remarks.

Table 2 demonstrates the mean differences in students' perception between the two groups. Although it is marginally not significant, students reported that conducting the PBL tutorial session in Arabic language made them more motivated in group discussion and gave them more confidence in expressing their thoughts. However, students perceived that they better understand basic sciences ($p < 0.001$), as well as deeper knowledge of common ($p < 0.001$) and uncommon topics ($p = 0.004$) when PBL is conducted in English.

4. Discussion

This study aimed to investigate the differences in the rate of participation of medical students during problem based learning (PBL) sessions conducted in the Arabic versus the English language. In addition, student perceptions regarding the use of native versus nonnative language were studied. English has been

Table 1

Mean number of propositions produced in small-group discussions, either in Arabic or English.

Variables	Discussion in Arabic Mean (SD) $n = 35$	Discussion in English Mean (SD) $n = 37$
Explanatory propositions	10.9 (8.4)	6.2 (6.2)
Descriptive propositions	19.2 (10.1)	12.9 (8.3)
Total number of propositions	29.9 (15.8)	19.1 ¹⁴

Table 2
Mean differences in students' perception between PBL sessions conducted in Arabic versus English.

Students' perception	Discussion in Arabic	Discussion in English	p. value
	Mean (SD)	Mean (SD)	
Stimulates group discussion	3.8 (0.9)	3.5 (1.1)	ns
Encourages comment feedback	3.6 (1.0)	3.4 (1.1)	ns
What do you prefer?	3.2 (1.3)	3.5 (1.3)	ns
Increases analytical skills	3.3 (0.9)	3.5 (1.0)	ns
Boosts confidence in expressing thoughts	3.6 (1.1)	3.1 (1.2)	0.06
Enhances critical thinking	3.1 (0.9)	3.4 (1.0)	ns
Improves communication skills	3.4 (1.2)	3.8 (1.1)	0.10
Helps in understanding basic sciences	3.1 (1.2)	4.1 (0.9)	0.001
Deepens knowledge of common topics	2.5 (1.0)	3.9 (1.0)	0.001
Deepens knowledge of uncommon topics	2.9 (1.1)	3.6 (1.0)	0.004
Learned much during this PBL	3.5 (1.0)	3.5 (1.0)	ns

the main language used in teaching among all Saudi medical schools. However, students who spoke in their mother tongue during the PBL discussion produced more explanatory and descriptive propositions than students who spoke in English only. This finding is consistent with earlier observations showing that students performed better in communications when they used their mother language.^{12,13} Rodrigues reports similar findings, suggesting that perceptions related to the participation in group discussion are, to a large extent, attached to difficulties surrounding language barriers.¹⁴ Other factors that may influence participation rate would be shyness of speaking in another language and fear of making mistakes.^{15,16} The investigators further reported that lack of vocabulary and fluency in the foreign language may also have limited the students' participation and expression of their ideas. None of these studies however presented experimental data to back up the investigators' claims.

Our data carry the suggestion that speaking in their native language increases medical students' confidence in group discussions. Students expressed more confidence in communicating their thoughts using the Arabic language (3.6 ± 1.1), compared to those who preferred to communicate in English (3.1 ± 1.2). This would be in line with an earlier cross-sectional survey at Lebanese medical schools that assessed the relationship between the language of medical education and the confidence in taking medical history in Arabic during clinical clerkships. Students were more confident in using their native language despite having their medical education in a foreign language.¹⁷ Other studies have also reported that the language barrier may cause anxiety and worry among health professionals limiting their

ability to discuss issues with their patients.^{18–20} These findings support the notion that language is central to the process of communication, as it allows people to express their emotions and feelings, share ideas and thoughts, and convey their views and opinions more easily.^{4,5}

Intriguingly, students who had to speak English contributed less to the discussions, indicated that they developed a better understanding of basic sciences and were able to gain deeper knowledge, than Arabic group indicated. A likely explanation for these findings is that medical students study the basic sciences, i.e., physiology, anatomy, pathology, in English language throughout their undergraduate years and have acquired more medical terminology in English than in Arabic. In addition, English is widely accepted as the language of instruction. All available resources and learning materials are in English which may support their perception of the importance of this language in the learning process. This finding is similar to Gupta and colleagues' study in an Indian medical college assessing the perception of students regarding use of English in medical education. They found that a majority of students and teachers believed that English should be retained as a medium of instruction since it is of global importance.²¹

Our study provides an argument favouring permitting student to express their thoughts in their native language as it encourages their participation, improves group dynamics and appears to boost confidence. However, it is important to keep in mind that a higher rate of participation in tutorial groups does not definitely indicate better performance.

We recognize that our study has several limitations. First, all participants were from the same institution and the same year of study. Second, the study sample

was limited to male students only. It is possible that having a sample from different institutions or different age and gender may yield different outcomes. Although we had good reason to assume that randomization of participants and tutors would eliminate any confounders, we did not check whether for instance GPA of the students under both conditions was sufficiently similar. Future studies with a larger sample size could explore the effect of the spoken language on the participation rate, taking into account possible confounding factors, such as age, gender, or GPA.

5. Conclusion

Most of the students perceived using the English language during the PBL session is better in understanding basic sciences and ensure deeper knowledge of common and uncommon topics. However, the current study found that students' explanatory and descriptive propositions was significantly greater among those who used their native language compared to those used an English (foreign) language. Further study is recommended to investigate the academic performance and gender differences between students using native language in PBL discussion and those using the foreign language.

Ethics approval and consent to participate

This study was approved by King Abdullah International Medical Research Center (Ref. No. IRBC/1193/16). Written consent forms were collected from all students and tutor before collecting the data.

Consent for publication

Not applicable.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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Authors' contributions

MT: Conceived the study idea, took part in the development of the objectives and design, collected the data, drafted and proof-read the manuscript.

MM: Conceived the study idea, took part in the development of the objectives and design, collected the data, drafted and proof-read the manuscript.

EM: Took part in the study design and conducted the statistical analyses. Contributed to the final manuscript.

AF: Took part in the study design and conducted the data transcription and analyses. Contributed to the final manuscript.

MT: Participated in the study design and data collection.

HS: Conceived the study, guided the design and data collection and contributed to the final manuscript.

All authors reviewed the manuscript and provided critical revisions. All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare that they have no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

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