

# Influence of Gender and Ethnicity on Problem-Based Learning

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## ABSTRACT

**OBJECTIVE:** Problem-based learning (PBL) is an instructional method of hands-on active learning, centered on the investigation and resolution of simulated real-world problems. However, given that PBL has a significant social aspect to it, numerous factors may interplay in the dynamics of a small group and influence the overall learning process and outcomes. Since every aspect of the learning experience is influenced by the prevalent culture, we reviewed the influence of gender and ethnicity on the PBL system.

**METHODS:** A review of literature was carried out using the PubMed and Google Scholar databases for the terms “Gender and problem-based learning” and “Ethnicity and problem-based learning” on August 6<sup>th</sup>, 2011. The results were filtered manually by the authors by reviewing abstracts for relevance to the topic. All relevant articles,

since the inception of the electronic databases, were reviewed. The final filtered articles were then reviewed independently by the authors and evaluated for repetition and relevance, following which a narrative review on the topics was compiled. Suggestions for the improvement of the PBL process were then set by an evidence-based discussion between the authors.

**RESULTS AND CONCLUSIONS:** Gender and ethnicity, among other independent factors, influence the outcomes of PBL. Heterogeneity and diversity are proven factors, which have positive effects on outcomes of small group learning activities. In the short term these might seem to hamper learning outcomes; however, in the end heterogeneous groups lead to comparable or better performance. Hence, efforts should be made to promote ethnic and gender diversity while distributing students into PBL groups.

**Keywords:** Problem-based learning; Active learning; Gender; Ethnicity

## INTRODUCTION

Problem-based learning (PBL), an instructional method of hands-on active learning, is centered on the investigation and resolution of simulated real-world problems. Its recent influence can be traced to the late 1960s at the McMaster University, Canada [1]. Thereafter, other medical schools globally took on the McMaster model of problem-based learning [1].

Based on the premise of small group learning with a student-centered approach, it allows students to contextualize knowledge in real-life case scenarios. Proponents of PBL believe that as a learning strategy, it develops critical thinking and creative skills, improves problem-solving skills, increases motivation and helps students learn how to transfer knowledge to new situations and arrive at solutions [2]. The facilitator directs and guides the students in the

right direction without essentially resorting to a lecture-based teaching method. This turns learning into group exercise and thus involves principles of teamwork. Hence, factors that affect team or group dynamics are very relevant to PBL.

Significant work has been done on understanding external factors that influence outcomes with PBL including the need for sufficient protected time, structure of the PBL case and its alignment with learning outside the tutorial room, role of the facilitator and student assessment [3]. However given the role of group participation required for a successful PBL session, factors influencing the interplay of individuals within the small group influence the overall learning process and outcomes. Factors identified include background knowledge level of students,

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independent study strategies and study hours, socioeconomic background, availability of educational resources, gender, ethnicity, generational effects, age, physical and learning disabilities, and political and sexual orientation [3-7]. Of all these factors, gender and ethnicity can most easily be controlled for when creating PBL groups. Thus, we decided to review the influence of gender and ethnicity on the PBL system.

**LITERATURE SEARCH CRITERIA:** A review of literature was carried out using the PubMed and Google Scholar databases for the terms “Gender and problem-based learning” and “Ethnicity and problem-based learning” on August 6<sup>th</sup>, 2011. The results were manually examined for duplicate entries. All relevant articles, since the inception of the electronic databases, were reviewed. All articles on gender and ethnicity in relation to their influences on PBL in undergraduate medical education were included in the study. Articles that addressed postgraduate medical education, subspecialty education, allied medical education, dentistry or veterinary sciences were excluded. We also excluded personal opinions and commentaries. Full text versions of the filtered articles were reviewed independently by the authors. The articles were evaluated for relevance, scientific merit and repetition based on the authors’ personal judgment, following which a narrative review on the topics was compiled.

**GENDER AND PBL:** Carlo et al studied the effects of gender on PBL groups in the United Arab Emirates. Students were divided into gender homogenous groups for PBL sessions following which the facilitators assessed group productivity. The authors found that female groups were more productive as rated by their facilitators. Furthermore, the female groups had significantly higher scores on motivation, cohesion, interaction, and elaboration, while they had lower scores for sponging and withdrawing ( $p < 0.001$ ) [8]. Their study highlights the need to take into account gender while setting up PBL tutorials [8]. Similar findings have been reported across literature, suggesting that males and females possess different styles of thinking, learning and have different approaches to problem solving [9-12].

Kassab et al aimed to identify the differences in learning outcomes between single gender PBL groups. They considered student performance in end of unit examinations as the primary measure

of learning outcomes. As a secondary outcome measure, they used self-administered questionnaires assessing student perceptions regarding the PBL sessions [11]. They concluded that even though individual performance in tutorials and achievement in examinations were comparable in both groups, a significantly higher group performance in terms of listening and information sharing was seen in female as compared to male PBL groups ( $p < 0.01$ ). Furthermore, they found that female groups were more conducive to faculty facilitators while male students responded better to peer facilitators ( $p < 0.001$ ) [11]. These findings highlight how female students are more apt at bringing together a group in terms of performance, and keeping the group on track in terms of learning processes. This is further supported by Smits et al who reported that the female gender is positively related to accretions in both knowledge and performance independent of the influence of other factors [13].

**Effect of gender on identification of learning objectives and social aspects of PBL:**

Al-Shaibani et al found that identification of group learning objectives, especially those with a psychosocial background, were better picked by the female students as compared to their male counterparts, who better recognized structural points [9]. Mpofu et al while assessing the priorities of students in PBL sessions, found that female students considered topics that facilitated their learning and exam success to be of more importance, whereas for the males, an environment conducive to participation by all was of more importance [14].

Reynolds, in his work noted that both female and male students felt that they were able to express their opinions within the seminar groups; however, women expressed more trust in the information provided by other students, confirmed greater enjoyment in taking responsibility for their own learning and had more positive views about working with students from another course. In their qualitative comments, more women made reference to enjoying the social aspects of PBL (such as group work, support and collaboration) [15].

**Learning strategies:** Wyller, when investigating the factors affecting study outcomes, reported that males are more prone to a strategic, result oriented method of learning with more emphasis on just getting through the exam. Surprisingly,

these students were more prone to failing on their exams and were less satisfied with their studies. This behavior was seen much less commonly in females implying that females being more connected learners focus more on the educational aspect of an exercise compared to their male counterparts [16]. This can be further explained by the fact that women maybe more apt at reasoning, as documented by Groves et al who reported female gender as one of the factors with positive predictive value towards better clinical reasoning [6].

**ETHNICITY:** Globalization and migration in the 21<sup>st</sup> century have significantly changed the outlook of the medical world by bringing into the mix a diverse group of health care providers and recipients. As medical practice is highly related to cultural practices and beliefs, knowledge and sensitivity regarding these issues is of utmost importance. Major heterogeneous communities including UK, USA, Canada and Australia have emphasized that doctors should become more culturally aware [17-21]. In fact, by the year 2005, 72% of UK medical schools included some form of formal teaching on cultural diversity [22].

Ethnic heterogeneity in medical education can provide a great platform for students to interact in a rich and diverse environment, with an opportunity to learn from each other's cultural differences and practices. This improves interpersonal dynamics and learning processes while promoting interethnic cooperation [23, 24]. In theory, participation in racially and ethnically diverse learning groups facilitates learning and increases student achievement [25]. Members of ethnically diverse groups develop more cross-ethnic friendships and have better attitudes and behaviors to individuals from different ethnic backgrounds as compared to their counterparts [25]. However, Roberts et al pointed out that students were hesitant in discussing race and ethnicity beyond the confines of medical discourse. They recommended that students need to be supported in understanding their own personal values and uncertainties in order to develop holistic values towards patient care [26]. Gender, race, and ethnicity may also influence levels of active participation within cooperative groups; Dornyei et al pointed out that leadership, decision making, trust building, communication and conflict management skills need to be inculcated in to participants in order to achieve the objective of cultural sensitization [5]. Adding to this, Singaram et al concluded that simply placing students in heterogeneous groups without

the essential skills needed for cooperation, and expecting them to be cooperative is unreasonable and ineffective [23].

While observing students in a management course in 1993, Watson et al demonstrated that heterogeneity in a group can be a cumbersome experience for certain individuals during the initial period [27]. Evaluating the outcomes of PBL sessions based on the perspectives in evaluating the situation, problem identification, alternatives generated and quality of solutions, they found that initially groups with culturally homogenous compositions had better outcomes; however, this difference was lost after a period of 17 weeks [27].

**PBL as a social tool:** Students in a new learning environment may be hindered in their interaction with fellow students by their social or ethnic backgrounds. McLean et al reported that the PBL tutorial may be an effective tool in facilitating student socialization into a new and unfamiliar academic environment, especially when students' personal past experiences differ from their current environment. When it comes to diverse student bodies, PBL is an effective method to enhance cross-ethnic socialization, resulting in improved interpersonal dynamics and effective learning amongst students. This fact is further supported by Singaram et al who concluded that small groups from diverse background can help in overcoming social barriers amongst students and allow collaborative learning amongst them [24].

**Negative aspects of ethnic differences:** Conversely, Cohen suggested that group work promoted status differences, with majority students viewing minority students as less competent, thus begetting rejection and exclusion. These findings support expectations theory which claims that "when a group is faced with a collective task, participants look for ways to judge the usefulness of their own contributions and those of others in the group" [4]. Even if these characteristics have no definitive basis, students may use factors such as gender and ethnicity to make assumptions regarding a group member's competence in the absence of direct information [25].

Our study has several potential limitations. We searched for only two databases using a limited set of search terms. Moreover, we only searched articles that were published in English language. Studies that were published in journals that are not indexed by PubMed or Google Scholar may

have also been missed. However, the preponderance of evidence supports the hypothesis that both gender and racial diversity enhance PBL when practiced over a longer period of time.

### CONCLUSION

Gender and ethnicity, among other independent factors, influence the outcomes of PBL. Heterogeneity and diversity are proven factors that have positive effects on outcomes of small group learning activities. In the short term these might seem to hamper learning outcomes; however, in the end heterogeneous groups lead to comparable or better performance. Hence, efforts should be made to promote ethnic and gender diversity while distributing students into PBL groups.

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