Cultural considerations in problem-based learning

Pedagogiskt docenturarbete

Stefan Koch
Cultural considerations in problem-based learning

Stefan Koch, PhD
Department of Biomedical and Clinical Sciences (BKV), Linköping University

Abstract
Problem-based learning (PBL), i.e. the student-centered solving of realistic problems in small group tutorials, is a powerful tool to encourage and promote active learning and academic as well as professional success. As such, PBL is considered one of the “key concepts” for student education at the Faculty of Health Sciences at Linköping University (Communications Department at Linköping University 2017). However, with an increasing focus on internationalization of new and existing curricula, it is important to raise awareness of cultural considerations that may affect PBL group work. Here I explore the relevance of cultural idiosyncrasies in team assignments and tutorship, and weigh them against current guidelines on the implementation of PBL as an active learning tool, as well my own experience as a PBL tutor at two faculties at Linköping University. I conclude by formulating actionable recommendations for the amendment of PBL education, which may facilitate improved learning outcomes especially for international education programs.

Background
Problem-based learning centers around the discussion and addressing of life-like, poorly structured problems by a small self-organizing group of learners with minimal guidance from experienced educators. Originally conceived as an alternative teaching modality in medical faculties, PBL is now considered a valuable educational instrument in numerous subjects as diverse as mathematics (Abdullah, Tarmizi et al. 2010), architecture (Banerjee and Graaff 1996), and management education (Sherwood 2004). Ideally, PBL should foster lifelong active learning, critical thinking, and team-working skills. However, the actual effectiveness of PBL remains contested (Colliver 2000, Pagander and Read 2014), and appears to depend critically on its correct implementation and supervision.

In particular, Norman and Schmidt (Norman and Schmidt 2000) identified "instruction in problem solving" and "[working] with non-expert tutors" as the key positive and negative determinants, respectively, of successful PBL-based education. Moreover, these authors note that "there are complex interactions among many of the treatment components, so that any estimate of effectiveness must account for these interactions". This suggests that despite the student-centered philosophy of PBL, the thorough and mindful training of tutors assigned to the groups is at least as important as, for example, the design of interesting and engaging scenarios, consistent with earlier reports (Roberts 2010, Setterud, Johansson et al. 2015). Indeed, Linköping University’s guidelines for PBL education emphasize that tutors should challenge and support ("utmanar och stödjer") students to promote active and productive group work, and should act as role models for communication within the group (Medical Faculty at Linköping University 2017). Accordingly, prospective PBL educators are required to undergo rigorous training at most Swedish universities (Setterud, Johansson et al. 2015), which highlights principles of group dynamics and psychosocial aspects of teamwork, among others.

One apparent shortcoming of the current PBL tutor training programs is the lack of cross-cultural perspectives of teamwork (Hansen and Du 2006). That is, although tutors are advised to take individual
archetypes into account, the impact of cultural archetypes on group performance is neglected. Below, I will discuss the effect of cultural differences on the individual and the group.

Cultural diversity and its impact on teamwork

Several theoretical models have been devised to summarize and categorize personal characteristics on a national level. In particular, the Hofstede model describes six cultural dimensions with which to classify societal character traits: Power Distance, Uncertainty Avoidance, Individualism/Collectivism, Masculinity/Femininity, Long/Short Term Orientation, and Indulgence/Restraint (Hofstede 2011). In essence, by identifying and quantifying stereotypical preconceptions and behaviors using empirical studies, these dimensions can be used to compare cultural differences between countries and thus inform policy and management decisions. Accordingly, cultural dimensions have been widely and successfully employed in business administration and management education (Newman and Nollen 1996, Pagell 2005).

One of the advantages of the Hofstede model is that it raises awareness for cultural differences that may, negatively or positively, affect collaboration in multi-cultural teams. Although the author himself rightfully cautions that “national culture scores should not be used for stereotyping individuals” (Hofstede 2011), other researchers have frequently confirmed the general validity of national stereotypes in real-life work settings (Staples and Zhao 2006, Müller 2009). For example, Müller et al. reported that Swedish and German industry workers have different decision-making styles, that team members in mixed Swedish-German teams are aware of these differences, and that they negatively affect group cohesion (Müller 2009). In general, however, the benefits of working in a multicultural team appear to outweigh the negatives. Indeed, a meta-analysis of 108 studies investigating more than 10,000 teams showed that cultural diversity increased creativity and satisfaction, albeit at the cost of lower social integration and higher conflict potential (Figure 1) (Stahl, Maznevski et al. 2010).

Thus, working with a culturally diverse team should be seen as a unique opportunity rather than a challenge, and must certainly be considered when setting up team-based tasks. In particular, team leaders should foster cultural awareness and cross-cultural competences, as these factors can have a considerable effect on team performance (Matveev and Nelson 2004). As Stahl et al. note (Stahl, Mäkelä et al. 2010), the “ultimate effects [of cultural diversity] on team outcomes may be dependent on whether consequent internal processes develop into virtuous or vicious circles”.

Cultural preconceptions of problem-based learning

Do these observations from business and industry also apply to the academic setting of PBL? Before discussing the cross-cultural aspects of PBL-based education, it is worth to briefly reflect on teaching styles in different cultures. Whereas in recent decades, students especially in Europe and North
America are increasingly trained in self-directed learning, students in the Middle East and Asia are generally more accustomed to receiving their education from an authoritative teacher. Indeed, Joy and Kolb note that preferences in teaching styles correspond well to Hofstede’s cultural dimensions assigned to these cultures (Joy and Kolb 2009). The authors emphasize in particular that cultural differences can explain much of the variability in preferred learning styles, being on par or more impactful than gender, level of education, and educational specialization.

Having learned alongside and trained students from a wide variety of cultural backgrounds in different academic settings (Germany, USA, and Sweden), my own experiences largely match these empirical data. Generally speaking, students from Northern Europe and the USA tend to engage the teachers, challenge and question learning contents, and participate actively in shaping their education. In contrast, I perceived that students from Asia (especially China, Taiwan, and Japan) preferred not to engage in discussions, and considered the teacher’s perspective to be the final word on a given subject. However, it should be emphasized that although students (and faculty) e.g. at Chinese universities might approach PBL-based education with hesitancy and even anxiety, one’s cultural background and ingrained learning philosophy does not get in the way of improved learning outcomes in curricula with PBL. Indeed, a recent meta-analysis of studies from medical schools in China showed that PBL increased knowledge and skill scores compared to traditional curricula (Wang, Xu et al. 2016), similar to earlier observations from South Africa (Iputo and Kwizera 2005), Peru (Moreno Alcázar and Fitzgerald 2005), and India (Nanda and Manjunatha 2013), among others.

One limitation of the aforementioned conclusion is that these studies investigated non-Caucasian, yet culturally homogeneous groups of learners. Thus, whether improved learning outcomes truly speak to the superiority of PBL-based training, or rather represent overall improved education within an adapted “PBL-hybrid model” (Song, Kwan et al. 2005), is hard to distinguish. Irrespective of this consideration, a more likely and increasingly frequent scenario that educators are facing in their everyday academic work is that of mixed international student groups. As discussed in the previous chapter, multicultural teams may encounter unique challenges due to differences in work styles, language, communication, etc., but have the capacity to perform better than culturally uniform groups because of their higher creativity and satisfaction levels (Müller 2009, Stahl, Maznevski et al. 2010). In line with these observations from professional settings, a limited number of educational research studies has found generally positive outcomes in multicultural PBL student groups (Singaram, Dolmans et al. 2008, Holen, Manandhar et al. 2015).

Reflections on multicultural PBL teamwork at Linköping University
Since 2017, I have been responsible for two courses at Linköping University: a second cycle course on stem cell engineering at the Faculty of Science and Engineering (three occasions), and a first cycle course on cell metabolism, signaling and biochemistry at the Faculty of Health Sciences (one occasion). In total, I have supervised more than 100 students (organized into 4-5 PBL working teams per course), of which approximately 10% came from a country other than Sweden, primarily European countries including France, Spain, Austria, and Germany. Very few students had prior experience in PBL-based education, as self-reported at the beginning of the courses. Thus, although the groups usually did not have a lot of cultural diversity, the courses nonetheless provided a good opportunity to observe the uptake of PBL in purely Swedish versus international teams. Below I discuss some key conclusions based on observation and memory minutes based on subsequent requests for feedback from the students.

Team composition and organization
Students were free to form their own groups within the constraints of PBL tutorial group recommendations (6-8 students per team), with placement assistance offered in case of disagreements. International students tended to cluster in the same groups, resulting in both homogeneous (Swedish only) and heterogeneous teams (Swedish/other) within the same course. In many cases, this was presumably due to prior acquaintance of the students, rather than a conscious preference. In general, purely Swedish groups tended to be slightly faster at settling on individual assignments, ground rules, and agreed learning goals, although these differences disappeared in later sessions.

Language

All students were encouraged to conduct their group work in English, although this was not mandatory. As expected, mixed international groups maintained internal discussions in English throughout, whereas homogeneous Swedish student groups frequently switched to Swedish language discussions. This difference did not appear to affect learning outcomes, as English language proficiency was generally very high for all students.

Communication

A marked and consistent difference in communication styles was observed in multi- versus monocultural groups. Especially in later sessions, when team roles and work distribution had been firmly established, international groups had longer and more engaged discussions on the subject matter, and the tone of discussion and body language suggested a high level of satisfaction and enjoyment with the teamwork. In contrast, discussions in purely Swedish groups trended towards a more to-the-point, structured reporting of ideas and learned facts, both during the initial "brainstorming" phase and the subsequent seminars. Of note, these differences were more pronounced in the second level than the first level course, possibly due to higher (self-)organization skills of the more experienced students, leading to more productive work.

Productivity

High as well as low performance groups, as assessed by the formulation of course-relevant questions and the discussion thereof, were present both in international and Swedish-only student groups. There was no apparent correlation between the discussion or work culture and the productivity of the individual groups.

Summary conclusions

My own limited observations are consistent with previous reports from multicultural PBL curricula (Singaram, Dolmans et al. 2008, Holen, Manandhar et al. 2015), and support the general usefulness of PBL in international student groups. The key findings are that: i) cultural barriers do not stand in the way of PBL implementation in existing curricula; ii) multicultural groups do not perform worse than culturally homogeneous groups, and group performance may be influenced more by personal than cultural characteristics (Holen, Manandhar et al. 2015); iii) student enjoyment and satisfaction may be greater in international teams, as discussions become more diverse (Singaram, Dolmans et al. 2008). These conclusions are tempered by obvious limitations: i) the observations were not evaluated by structured analyses, such as interviews or surveys; ii) most of the non-Swedish students were from European countries, i.e. a culturally similar backgrounds, although notable differences in working styles may exist even between these countries (see reference (Müller 2009)).
Relevance for tutor training and course design

If cultural diversity does not impair PBL-based education, and may in fact increase student satisfaction, the obvious question is whether cultural perspectives are an issue that needs to be addressed. I argue that this question should be turned on its head, given the apparent discrepancy between the potential of multicultural teamwork (Stahl, Mäkelä et al. 2010, Stahl, Maznevski et al. 2010), and its very modest observed effect on student team performance. Rather than worrying about how cultural differences might negatively impact group performance (likely a self-correcting or non-issue), we should rather consider how we - as PBL tutors - can support team diversity to improve learning outcomes and professional training of all students.

Here it is helpful to look at controllable factors that affect the performance of multicultural teams (Figure 1). In their meta-analysis, Stahl et al. (Stahl, Maznevski et al. 2010) identified four elements that significantly impacted performance specifically in multicultural groups: team size, task complexity, team tenure, and team dispersion.

1. Regarding team size, current PBL guidelines at Linköping University already recommend limiting the number of students per group to 6-8 (Medical Faculty at Linköping University 2017), in line with the relevant literature (Steers and Rhodes 1978, Mullen, Johnson et al. 1987). Since increasing team sizes negatively affect satisfaction, which is a major advantage of multicultural teamwork, a reasonable amendment to this recommendation may be to keep group sizes at a maximum of six members, especially if only one or two international students participate. In this way, the relative cultural diversity in the group increases, which will likely improve creativity and satisfaction.

2. Regarding task complexity, contrary to the authors' expectations, greater complexity was associated with increased conflict potential (Stahl, Maznevski et al. 2010). Given the inherently high complexity of unstructured PBL scenarios, it is therefore to be expected that intra-group conflicts are amplified in multicultural groups. However, "conflict" particularly in education may not be negative per se, as it includes productive task conflict. Thus, instead of lowering the complexity of the scenario, tutors should be advised to more carefully look out for signs of conflict, and intervene if the dispute shifts from task to personal or process conflict.

3. Regarding team tenure, i.e. the duration for which a group works together, it is my belief that the negative effects on communication and conflict potential observed by Stahl et al. (Stahl, Maznevski et al. 2010) will not play a major role in academia. Unlike in business and industry, PBL groups stay together only for a limited amount of time, usually the duration of the course. Thus, preventative measures need not be considered.

4. Regarding team dispersion, i.e. whether the team works at the same location or not, this factor is normally not controllable in the academic setting, since students will be working in the same room by necessity. However, as groups will not be working together for an extended duration (see point 3), any possible negative effects on conflict potential and social integration will likely be mitigated by the positive effect of close proximity in the team building phase.

As can be seen, correcting adjustments to the training of PBL tutors can be kept to a minimum when considering the supervision of multicultural groups. At the same time, however, it would be unwise to ignore the not just theoretical, but measurable impact of cultural diversity on group performance, which acts independently of personal characteristics of the individual. Thus, a reasonable initial amendment to the PBL guidelines and training at Linköping University should be to make educators and tutors aware that these cultural effects exist, and that they should be seen as an opportunity to
improve student satisfaction and creativity. This could be achieved with minimal effort, and without any major changes to course design and coordination. Given that cultural competence is seen as a critical skill for optimal team performance in professional settings (Matveev and Milter 2004), education at Linköping University would likely benefit from these adjustments as well.

**Conclusions, limitations, and outlook**

This report explored the potential impact of cultural diversity on team performance in PBL tutorials. The paper is based on an extensive review of relevant literature in business administration, management, and education research, as well as the author’s first-hand experience as a PBL tutor at Linköping University. The main findings are that: i) cultural diversity affects teamwork independently of personal characteristics; ii) positive aspects of multicultural teamwork outweigh potential drawbacks; iii) minimal adjustments to current tutor training may result in improved student satisfaction and learning outcomes.

The main limitations of this study are twofold: Firstly, the literature research draws on a limited number of studies that have specifically investigated the effect of cultural diversity in student education in a PBL-based curriculum. It is thus unclear whether findings from research in business and management are directly transferable to an academic setting. Secondly, the author’s personal observations are tempered by a limited number of supervised international students, who were mainly from central Europe. Whether the subjectively positive attitude in multicultural groups would also be apparent with students from vastly different cultures, such as Japan or Africa, remains to be explored further.

With an increasing focus on international orientation and competition, Linköping University is set to attract more and more foreign students and educators to its state-of-the-art research programs. This change presents exciting opportunities, but also unique challenges in the years ahead. As such, this paper will hopefully contribute to a fruitful dialogue on the evolution of student training in Swedish higher education.
References


