Education across borders: Technology supported mentoring and teambuilding

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Abstract

Many universities in North America and Europe possess trained faculty members, focused research environment, evidence-based teaching pedagogy, and other tangible resources, while many universities in South America, parts of Europe and India score poorly on many of these dimensions. This disparity in the quality of educational institutions has led to many initiatives that bring together students from developing nations and mentors from developed nations. I survey some of these mentoring approaches and discuss their strengths and limitations. On the contrary, Massive Open Online Courses (MOOCs) provide an open platform that can be used to bring together learners from across the globe to learn with each other. I discuss the challenges and opportunities around creating student teams in MOOCs to build learning experiences across borders.

Author Keywords

Cross-cultural learning; MOOCs; education.

ACM Classification Keywords

K.3.1 Computer Uses in Education

Call for collaboration

As a Computer Science student, I've learnt about building systems. As a Design student, I'm learning

about building systems to meet real needs of people. However, I lack the expertise and time to understand these needs myself. I need to learn from people who have a deep understanding of challenges in providing access to education to learners in developing communities. For example, while I've read that shortage and absence of teachers is an important problem in schools in rural communities in India, I don't know why is it difficult to solve. Is it because there aren't sufficient instructors, or because they haven't been trained, or that trained instructors lack intrinsic/extrinsic motivation? Underlying this is an assumption that learners are curious to learn. Is that even true? Overall, I want to know answers to such questions, along with their limitations. This will help me understand how can technology provide help, if it can. While I've described mentoring and team-building activities below, I need evidence that these are potential solutions for a real problem.

Borders impact quality of education
Borders show up on maps as logical constructs and on ground as way for countries to claim their territory. However, they have a deeper implication on the political processes and socio-economic institutions in the separated countries, even when people and cultures across border might be very similar, as in the case of Nogales, Arizona and Nogales, Soronoa (whynationsfail.com/table-of-contents/). Similarly, the ideology, planning, execution and evolution of an educational system is also tightly linked to the affairs of the state. This further feeds into the nation's development process, since the opportunities created and availed by students depend, among other factors, on the working and thinking skills provided by education system.

To add cross-cultural elements to their great education, students from universities in North America or Europe have the opportunity to spend a semester abroad in another country (typically) to experience living in another culture. However, students in other places find themselves at a lack of these opportunities, perhaps due to economic factors. To partially solve this problem, some groups organize initiatives to link students from developing nations to mentors in universities in developed countries. While there are a large number of international efforts by development agencies, non-profit organizations and government arms, I'll focus on the student-led initiatives since they identify the needs and resources from a more situated personal experience.

Mentoring provides guidance towards creating and achieving goals
Mentoring cultivates metacognitive skills, leading to gains in career outcomes, job satisfaction, organizational socialization, and income measures [2]. Mentoring is distinct from tutoring. While tutoring focuses on imparting specific skills for improved performance at task, mentoring focuses on improving high-level skills about setting goals, making decisions and efficiently using resources. In the educational context, for instance, mentoring can help students form career plans and know about options they otherwise would be unaware of.

Push model: Send mentors to students' universities
Clubes de Ciencia Mexico (www.clubesdeciencia.mx/) brings graduate students from US universities to mentor high school and college students in Mexico. While spending a week in the hosting city, the mentors design and execute a STEM workshop with hands-on

work. Similarly, Alumni Research Talks (art.bits-csa.org/) initiative at an undergraduate university in India hosts alumni speakers from around the world who deliver talks and interact with students over 3 days.

Pull model: Host learners at mentor universities Some Greek student bodies at US universities, including Hellenic Student Association at UC San Diego (hellenic.ucsd.edu/), host Greek undergraduates to meet graduate students and faculty to inspire them to learn new ideas and possibly study towards an advanced degree. Another program at UC San Diego, Enclave (graeve.ucsd.edu/ENLACE/) brings high-school students to university over summer to work with graduate students in their research labs.

Mentoring in its current form hits scaling issues In all cases mentioned above, students learn about an educational and research system typically more advanced than theirs, either by visiting it or by discussing it in person with students of these universities. Unsurprisingly, individuals who know about both educational worlds are the ones to start these initiatives. Similar to tutoring, such personal mentoring and close contact works only for a small number of mentors or learners due to limited time and monetary resources. However, even if generous sponsorship were to somehow scale the resources, it is not clear that there would be sufficient number of motivated mentors. While it's heartwarming and fuzzy to make a note of these attempts, it is difficult to find a way scale to all interested students who could avail this opportunity.

Technology supported mentoring might not scale as well

As interest in online education grows, it is tempting to think about scaling the mentoring process using technology by assigning remote mentors. However, it is unclear whether this preserves the core features of current mentoring programs: close contact, mentors' and personal interest in the students' growth. Furthermore, it might be limited due to the core problem of limited number of motivated mentors, since the incentive for the mentors is unclear, apart from the satisfaction of helping the broad student community. Remote mentoring takes mentors away from their regular responsibilities as compared to the immersive experience they have with students in the same physical space. Much too frequently, we've started a good long-term task only to have "life" come in the way.

Can we scale learner interactions using technology instead?
UC Berkeley Computer Science Professors Dave Patterson and Armando Fox have recently teamed with Professor Juan Carlos Lavariega from Instituto Tecnológico de Monterrey in Mexico to put out a call for students across both universities to collaborate on their Software Engineering course projects towards building useful software for a nonprofit relevant to both USA and Latin America (www.armandofox.com/2015/06/collaborate-with-mexican-software.html). While this is scheduled for Spring 2016, this effort draws our attention to the current online education platforms, which already have students from around the world participating in the same online "classroom".

Steps towards building learner-centered virtual teams in MOOCs

1. Understand the needs of students across different locations, via surveys (quantitative data) and interviews (qualitative data)

2. Understand difference between educational systems of learners and identify the norms they might be used to

3. Clearly identify learning objectives of all learners and note the differences

4. Find scaffolding for proper team functioning; for instance, identify nature of collaboration (real-time or asynchronous etc.) towards the goal

Virtual Teams in MOOCs: go or nogo?

Collaborative problem solving should factor in student's personal goals

Massive open online courses (MOOCs) offer the opportunity to form cross-cultural teams and inform students about different educational systems in the process. Talkabout [4] allows students to participate in video discussions with other students from around the globe taking the same class. An instructor-designed list of discussion topics helped structure the discussion. Follow-up work Talkabout+ [8] explored collaborative problem-solving in these video discussions and found that participants engaged in problems only when they aligned with their motivations for joining the discussion. For instance, a student who wished to receive feedback on her ideas did not enjoy distinct problem-solving session unrelated to her ideas.

Cross-cultural differences must be tackled

Unlike a traditional university classroom, online students are more heterogeneous across cultural, linguistic or socio-economic dimensions. How will these factors play a role in students' motivation and performance? For instance, does a student's *home education system* have an effect on his/her perception of quality of work, failures and deadlines?

Global organizations and crowdsourcing work might provide some hints

Global corporations form international, cross-cultural teams. A typical approach is to silo one team at one location and have limited points of interaction with other teams to allow the productivity benefits of co-location. Would clustering by nationality and subsequently forming teams based on min-cuts in the graph be best for online learners with the explicit new objective of learning from others distinct from us?

Previous research [3] has found that team leaders play an important role in initiating and sustaining collaboration, an important part of smooth working of team. Even in a brick-and-mortar university course, teams need guidance and polling to ensure they function smoothly towards meeting their objectives. The importance of face-to-face contact [9] in the functioning of remote teams is well known, as elucidated by large corporations that frequently have their team members travel for small durations to the mothership. How can these ideas be applied when face-to-face contact in the same physical space is not possible?

Crowdsourcing researchers have described techniques to from real-time teams for a number of purposes such as captioning and labeling [5], while performing large, open-ended work by breaking it into smaller ones has shown promise as well [1]. These principles could help identify techniques to build virtual teams towards working on large projects with low-latency.

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