

International collaboration on blended learning in the medical education – flexible multimedia modules for collaboration and increased student performance

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ABSTRACT: Here we describe a novel international collaboration on flexible pedagogy in medical education. Pooling our pedagogical resources to best meet the demands of our students is needed; we face the same digital trends, pedagogic tools and learning environment globally. Flexible digital learning tools benefit all students. Each student can use their own learning method of choice, whenever and wherever they choose. Particularly, this benefits students facing barriers, economic, physical or psychological, allowing more control over pace and timing of their learning –thereby facilitating broadened recruitment and democratization of knowledge. Using complementary digital learning resources, especially integration with mobile applications removes these barriers. Outdated pedagogical approaches disengage students. The in-class experience must be transformed: moving away from didactic sessions and towards meaningful exchanges of ideas and importantly, application of knowledge to real life situations. As partners, we have identified the same need for pedagogic development and our students share similar challenges, albeit on different continents. Our collective knowledge of teaching and learning strategies and techniques and our different backgrounds and contexts gives us a multifaceted approach covering most angles of flexible learning. Now we produce a common repository of digital learning material, quality assured by our universities for use in a global context. This can be tailor-made to the needs of the individual partner. Also, crowdsourcing by a digital intercontinental student collaboration is being initiated; students helping students.

1 BACKGROUND

Higher education is adapting to a globalized world, which values greater collaboration -the educational arena is getting ever wider. Joint national programs and initiatives for open learning, such as MOOCs are examples of this. National as well as international cooperation is perhaps more important than ever for shared experiences and quality assurance.

A modern approach to education requires us to re-think the way we approach the classroom: We can access knowledge more easily than at any time in human history and the sharing of this body of knowledge around the globe has become easier than ever. There is no excuse for a large discrepancy in the quality of education around the world – if we develop networks that allow for global distribution of knowledge, help each other with the best use of this knowledge with our students in the classroom. Knowledge transmission is no longer in the hands of a select few; technology lets us share this knowledge and helps us develop networks around the globe for equitable, integrated and high quality education.

We have developed methodologies that use technology for a flexible approach to learning: this opens the door to using the time together in class to a much higher yield: the application of knowledge and the discussion of concepts for a deep understanding of the subject. The evolution of digital media over the past years has led to mature well-established tools that have become a natural part of society and student learning. Technology needs to be harnessed to meet the demands of the classroom and the students' needs for learning. Technology has given us the means through which we can share knowledge, expertise and experience with students everywhere. A desire to learn and true enthusiasm for the subject matter can be enhanced through the integration of core media resources with a renewed classroom experience.

As University teachers, our primary mission is to communicate the curriculum to the students and to ensure goal achievement through examination. This requires an effective dialogue and sensitivity to the students' perspectives and individual learning patterns and the adaptation of teaching methods in this direction. Pedagogic development is therefore a fundamental parameter to improve and assure the quality of future University education of the highest class. The use of complementary learning resources in the form of digital technology, especially through the integration with mobile applications removes these barriers to student engagement, it makes the educational experiences fit seamlessly into the digital and online reality the students live in. These resources also allow for an unprecedented opportunity to share education between universities. These technologies are an integrated part of our social fabric, around the world efforts are made to establish stable communication networks that allow everyone to access knowledge. This democratization of knowledge now needs to be transformed into the basis for the preparation of students for their University studies.

Now that students can access knowledge, it is up to faculty to create vetted repositories of information, to create cohesive learning spaces and flexible, modular units that can adapt to the needs of individual students and individual curricula. None of this development takes away from the value of the in class experience, it rather changes this to be a more valuable experience, away from a one way street of knowledge transmission and into a creative exchange of ideas and a facilitated application of knowledge. In our medical undergraduate context this refers to the understanding of a clinical scenario and the approach to that particular symptom based on the integrated acquisition of basic science knowledge.

2 DISRUPTIVE TECHNOLOGIES

All signs point in one direction [1-5]. We are facing a digital revolution of University teaching and we need to adapt. Just like in 1450 when Gutenberg introduced the printing press, new disruptive digital technologies will change the way that we teach and study. Gutenberg made knowledge more accessible and facilitated the distribution of knowledge. The digital revolution takes this concept of easy and immediate access to knowledge to the next level: students can now actively and directly participate in the creation and sharing of information and resources. The role of the teacher is now shifted away from “sage on the stage” and even away from “guide on the side” [6] to an *active partnership* with the students as they create content. Students are no longer restrained by the formal physical and temporal requirements of a traditional course, their education has become more interactive and more flexible as students and faculty collaborate on educational outcomes. This allows for the students to take an active role in the formation of their studies and to become *co-producers* of their own education [7, 8].

3 INTERNATIONAL COLLABORATION ON BLENDED FLEXIBLE LEARNING

As University teachers we understand that the entire world is now the learning arena. In this project we have initiated an international collaboration to develop and evaluate new tools for flexible learning; in particular for enhanced recruitment of students from non-academic social backgrounds and for the use of facilitating learning for students with special needs.

Flexible learning enables pedagogical and logistical flexibility so that students have more choice in their learning opportunities, including when, where, and what they want to learn. As defined by the University of British Columbia (UBC), blended learning “is the organic integration of thoughtfully selected and complementary face-to-face and online approaches and techniques” [9]. Blended learning involves “rethinking and redesigning the teaching and learning relationship” [10], to both reposition how learners engage with materials and content in the course, but also how they interact with their peers and their instructors. Blended learning can be further divided into categories that reflect the impact on how a course is organized in terms of meeting times or the types of activities that take place, or both.

Our project seeks to bring experienced educators from around the world together to create a common repository of digital material to be used by our respective students. This will include video and interactive media for didactic knowledge transmission, active in-class activities to enhance the application of knowledge and a joint database for assessment methods. Teaching resources will be created as joint projects between the institutions and importantly, through the engagement of our students. Students from all our institutions will collaborate to create and share learning resources and

content. This will include the development of a large bank of annotated practice questions, where students discuss and explain their understanding of course material with one another. Our unique contribution in this project will be to connect learners internationally, effectively leveraging the skills and talents of students from all our partner institutions.

Our universities all have a long track record of being innovative with respect to teaching practice. We have experimented with techniques to increase student engagement in classroom as well as online-based activities and introduced evidence-based practices to foster skills and higher order learning. We have enhanced the quality of learning materials, increased student interactions with their peers and with faculty and increased the value and impact of both in-class and online assessments.

4 OUTCOMES THIS FAR

To date, we have worked at our home institutions to develop and implement disruptive approaches in the classroom. These changes have had a profound effect on student performance, in particular in the flipped neuroanatomy pilot project at UBC, where we were able to enhance student performance in exams and we were able to demonstrate that we had the largest effect on the students in the lower percentiles of performance [11]. The learning resources created for this flipped classroom approach include instructional videos and learning modules that are posted online under a creative commons licence. They are used around the world in various institutions as part of their class material or by students who find this material helpful as they prepare for their classes. It was this global impact that prompted the idea to establish a formal network and to engage more partner institutions.

In Lund we were able to engage students to create digital media for peer to peer anatomy instruction [12]. The films were produced with a very small budget using medical students of the higher semesters (Teaching Assistants) as instructors. Similarly we recruited journalist students as producers and directors. In a follow-up project we have now initiated the filming of the Latin curriculum, for the medical students in Lund, that was introduced a few years ago as a key to help the students to deeper understanding of the anatomical terms (see separate abstract in the same proceedings).

The impact of these videos was felt throughout the continuum of medical education into the clinical years. It can often be challenging to bring students “back to basics” once they are in their clinical years, an online repository of anatomical information can transport the anatomy classroom to wherever it may be needed

In both institutions the reverberations of this approach reached well beyond the classroom the material was intended for. The in-class time was used for much higher yield learning with the application of knowledge and a true understanding of often complex material. This also means that we now can redirect the focus of the teacher-lead sessions to the more complex discussions regarding functional and clinical anatomy. The students are no longer passive consumers but rather active participants in their own education.

Another important feature with the flexible learning environment is the adaptation to individual needs. All students have their unique pattern and technique of learning; in particular this is important for students with special needs like dyslexia and attention disorders[13]. The statistical measures show that the students use the multimedia material in preparation for the teacher lead sessions, as was our intent.

5 LOCAL DIFFERENCES IN APPROACH, A STRENGTH

As partners in this project, we have all identified the same need for pedagogical development and our students share similar challenges, albeit on different continents. Our collective knowledge of teaching and learning strategies and techniques and our different backgrounds and contexts gives us a multifaceted approach that covers just about every angle of flexible blended learning. Partnerships with universities will allow for knowledge transfer and collaborations on the development and implementation of varied curricular approaches. The imperatives of education in the UNESCO post-2015 agenda demand increased equitable access to education, quality education, a focus on marginalized groups, gender equality and the provision of life-long flexible learning opportunities [14]. Our project seeks to address these exact points for medical education in the anatomical sciences. We seek to establish a network of educators around the world dedicated to the creation and dissemination of quality resources for the education of our students. We want to open our classrooms

and encourage our students to learn together and collaborate with health professionals around the world in the digital realm. This will promote a sense of global citizenship and shared responsibility for worldwide health outcomes. Local experiences and conditions will add to the collective pool of knowledge. It is this diversity that makes the collaboration strong and sustainable.

Another key element of this network is a shared faculty development initiative – in order for a successful implementation of these disruptive technologies in the classroom we need to train faculty in how to use these tools effectively and in how to transform the in-class experience. One part of this faculty development will be an online module on the “how-to” towards a blended learning environment in the medical sciences and another part will be hands-on workshops with local faculty at all partner universities.

6 PROMOTING THE DEMOCRATIZATION OF KNOWLEDGE

The blended learning approach with flexible digital modules will give the individual student the possibility to choose the optimal learning aids. As a consequence, this will increase access to knowledge for all student groups. Most students around the world today have access to the Internet, either via computers or, increasingly, through their mobile phones. Internet access is thus an integrated part of their everyday life and often fundamental for social interaction. In some social settings such technologies are likely to be less threatening than actual/physical books and an academic environment. Therefore using digital interactive media may be the perfect learning environment for students lacking academic role models or unaccustomed to traditional University teaching and learning techniques. This could be one way to facilitate broadened recruitment, an important core value of our universities.

7 CONCLUSIONS

This project is launched as a measure to face and adapt our University pedagogics to the new digital reality that is already a fact of life for our students. We believe that these digital tools for *flexible learning* will enrich, enhance and improve the learning environment for all learners. In particular, we believe that the availability and the possibility to adapt the learning situation to serve every individual need is going to revolutionize the way that we teach today. The outcomes of this collaboration will have wide-reaching impact on medical education in particular, but also on University teaching in general around the world and will guide the development of curricula. Beyond the initial months, the flexible learning approach will support the students with resources they can access at their own learning pace and transform the University classroom into one of inquiry and knowledge application. We will educate students who are confident with their knowledge and can apply this knowledge to meet the demands of their clinical experiences. By introducing flexible, blended learning we can *flip the classroom* and focus the teacher-led time on what University teachers actually do best, explain complex questions. Our vision is a *global project on flexible learning*. Through the creation of a common international repository of quality assured digital flexible teaching material we remove the barriers for a quality assured worldwide medical education. Through this sharing of the common knowledge base we can all benefit from our local expertise and a common understanding of global health issues.

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