The Advent of Online Education (Part I)

The following entry has been inspired by my participation in 'Effective Online Tutoring' with Oxford University. Part I explores broadly the current trends in online education and its pedagogical implications.

1. Flipped Classrooms & Blended Learning: The Pragmatist' Approach to Empower Learners

2. Graduate, Postgraduate & Professional Online Courses: Tutor-based Environments

3. Massive Open Online Courses (MOOCs): Educating the World?

Image (above): *As numbers of 'digital natives' increase, do education systems catch up?*

The Digital Revolution and the Promise of Student-centered Education

In online education the facilitator or tutor has to define not only the scope of what should be learned, but also has to set the conditions under which learning is facilitated. This *explicit definition* of presented teaching materials, intended learning outcomes and course delivery is arguably the biggest conceptual difference as compared to traditional face-to-face learning. Online environments put the traditional employment of lectures, books, grades and exams under scrutiny. Epistemologically the *'sage on the stage'* is no more the center of knowledge-creation and dissemination in a globalized world – to students with diminishing appeal. Online delivery entails the option of choosing between synchronous and asynchronous student-classroom interaction, enabling them to learn at individual pace and style. *Adobe Connect e.g.,* is a sophisticated platform for delivering content synchronously. But does online education *necessarily* entail a more student-centered learning experience? Which conditions need to be fulfilled for e-learning to improve the quality of education? We shall have a look at some most prominent emerging models.

1. Flipped Classrooms & Blended Learning: The Pragmatist' Approach to Empower Learners

In a nutshell, in a flipped (or inverted) classroom traditional class-work is done at home and homework is done in class with the help of networked media technology *(Mangan, 2013)*. The rationale behind the flipped classroom is that valuable face-to-face time should be maximized to support the development of higher cognitive skills such as application, analysis, synthesis, evaluation and problem-solving. Students acquire conceptual knowledge or 'How To'- skills via videos at home since one-to-one learning is more effective.

In short, the *'sage on the stage'* moves into an online video that students can watch at their convenience at home while the lecturer turns into a *'guide on the side'* when students apply and develop new knowledge in collaborative classroom sessions. The flipped classroom encourages self-directed learning at home and collaborative problem-solving in the classroom.

A practical example: Online videos that are reviewed at home may end with a final quiz and reflections that students write down after watching. The results are sent back as online feedback to the tutor who, when the class meets face-to-face, already has obtained a good overview how well the class has grasped the understanding of 'prior knowledge' *(Mangan, 2012)*. By comparison, in a traditional classroom a lecturer has little overview about which student has understood how much. Flipped classrooms create more accessible data that tutors can use for formative assessment. Formative feedback and self-directed learning can effectively boost self-esteem and motivational beliefs *(Nicol & Macfarlane-Dick, 2006)*.

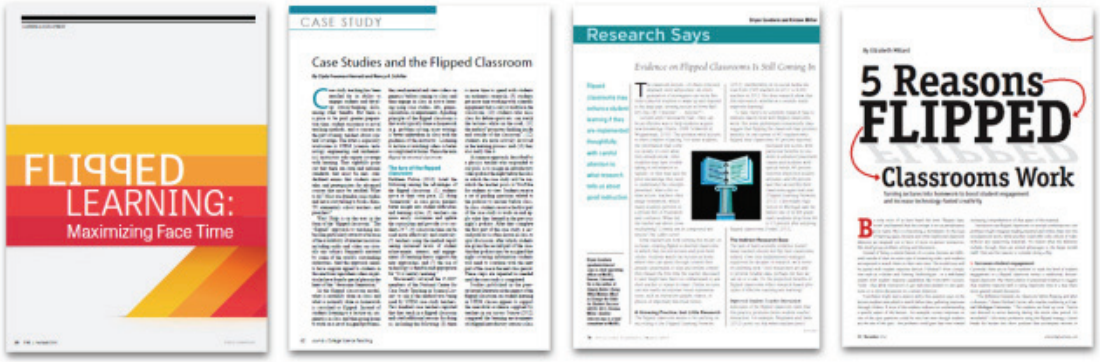

Image (above): *The Flipped Classroom has become a popular trend in undergraduate education*

Flipped classrooms are becoming a success-model in many schools and colleges around the world as they increase between-persons interaction. Criticism often comes from students that still prefer a *'sage on the stage'* and the commonly voiced-out argument to '*why should I pay for my own learning?*' Traditional lecturers may also find it hard to let go of their power-position to switch from a 'sage on the stage' to the 'guide on the side'. In active, learner-centered pedagogy the student takes full responsibility for his or her learning. Educational autonomy and self-governance is the prerequisite for embarking on lifelong learning.

The flipped classroom model is very adaptable to fit virtually any subject. An extended conceptual term is *'blended learning' (MacDonald, 2008)* which goes beyond mere 'flipping', and includes online tutoring and the creation of *'Blended Learning Communities' (Kaplan, 2002).* Early introduction to such models supports students' self-efficacy to participate in virtual online communities *(Vesely et al., 2007).*

Besides online videos, prior knowledge can be disseminated via online reading materials or discussion forums where students summarize their initial understanding of a topic. Freely available Open Source software such as 'Moodle' (Moodle.org) allows schools and colleges to set up virtual classrooms without surrendering to more costly subscription models. Social networks such as *'Facebook'* can be set up to facilitate initial student feedback and discussion. Lecturers can e.g., prepare podcasts which can be downloaded at home or on mobile devices. Technological options are plentiful. In-class sessions logically start with a short review and discussion of material that has been presented online followed by rich, team-based learning activities.

Assisting staff can be professors who are content experts or invited experts. Student tutors can facilitate the group learning process, giving more freedom to faculty on how to provide optimal resources. Teachers are needed as experts in their field to assist students in practical activities rather than attempting to 'teach' a class in a low (or no)-feedback situation.

Image above: *In a 'Flipped Classroom' online preparation is done at home and collaborative, assisted teamwork is moved into the classroom. This 'flip' supports self-directed learning at home while maximizing face-to-face time (engaging higher cognitive skills) in class.*

2. Graduate and Postgraduate Online Courses: Tutor-based Environments

Most online environments realized for Higher Education (and adult professional training) offer a wide range of State-of-the-Art technologies, both synchronous and asynchronous. They include, often within a single polished interface, options such as tutor-guided discussion forums, published weekly reading materials (both mandatory and optional), various specialized online rooms to post questions, access to essential electronic libraries to conduct peer-reviewed research, institutional email, online live chat and faculty contact including student supervisors, course managers, tutors, teaching assistants, e-librarians and the IT-Helpdesk.

Students are introduced to new concepts via weekly publications and they are assessed personally with qualitative and quantitative feedback from their tutor. Learning outcomes and grading criteria for each study week are published beforehand to students.

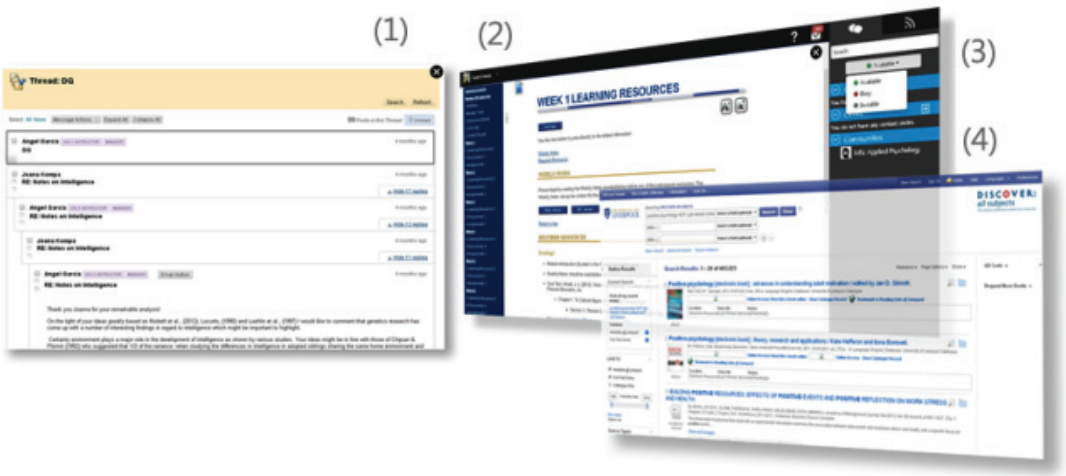

Image (above): *Tutor-based virtual classroom. Credit: Liverpool University/ Laureate Education (1) Discussion Forum: Posts can be collapsed for easier viewing, (2) Weekly Learning Resources (available as PDF and in HTML), (3) Live Chat, Circles and Communities, RSS feeds, (4) Online Library with Advanced Search-Function and Automated Referencing Management. Blackboard (Blackboard.com) is a polished commercial platform for teaching, collaborative learning and training.*

Online participation is mandatory as social interaction plays a central part of the educational process. Further 'luxuries' include automated services to order study books in a timely manner, pay tuition and library fees online and review past grades. Many institutions use the commercial platform '*Blackboard*' as their backbone which, in its latest version, also supports synchronous group collaboration. Teaching materials include literature as well as videos and multimedia presentations, e.g., for the presentation of case-studies or simulated clients. Students are educated to become successful problem-solvers, critical researchers and sociable team-players, the pedagogical assessment dimensions in Problem-based Learning (PBL).

Needless to say that such luxury comes at a price. The heavy price-tags for graduate and post-graduate studies disadvantage students from low-income backgrounds. Students from socio-centered cultures may face adaptation issues when dealing with 'Western style' critical discussions and argumentation, open critique, the facilitating nature of a tutor (instead of expecting instructional teachers) and responding to individual styles of colleagues from different countries. Tutored online classes are not indefinitely scalable and typical online class-size varies between 10-16 students. Large tutorial groups create distinct disadvantages *(Barrows, 1992)* such as

1.) The pleasure of working on a close, personal basis is lost to both students and tutor.

2.) Students do not get equal opportunity to voice out their ideas and adding their contributions and individual ideas into the group's ongoing deliberations.

3.) The tutor is unable to monitor each student's educational growth and may not detect emerging problems early, exactly when interventions are most effective.

Hence the often quoted argument of non-scalability of tutorial classes misses the point. One way of accommodating larger classes is to split them up into smaller groups, which demands some large- group management of its own. Open Source platforms such as 'Moodle' have leveled the playing field for institutions intending to host more complex and interactive courses as the software does not require the payment of licensing fees. Social networks often complement as a more informal base for study-groups the official learning platform.

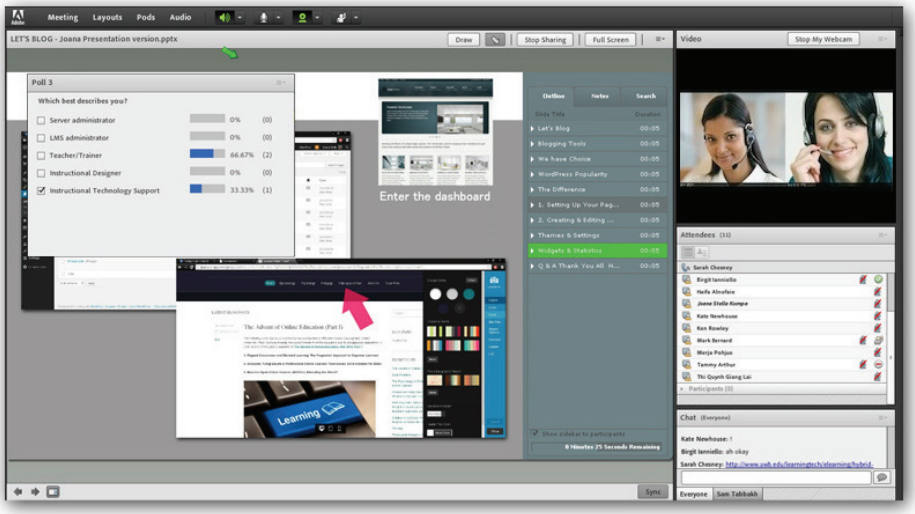

Image above: *'Adobe Connect' Synchronous Real-Time Learning Platform with video conferencing, live-chat (one-to-one, one-to-many), virtual meeting & discussion rooms, document sharing and online polls*

Examples for Online Tutorial Education: *Laureate Education, University of Californa-Berkeley, MIT, Oxford University, Stanford University, Harvard University, University of Liverpool, Walden University, Princeton University*

3. Massive Open Online Courses (MOOCs): Educating the World?

MOOCs are realized as large-scale, tutor-less virtual classrooms. The largest learning environment ever set up and counting 160,000 subscribers was the course *'Introduction to Artificial Intelligence'* conducted by Peter Norvig and Sebastian Thrun. Learning in MOOCs is facilitated by the presentation of videos, interactive quizzes, multiple-choice questionnaires and access to teaching materials, e.g. as PDFs. Many MOOCs offer peer-to-peer (p2p) forums where students can meet fellow learners to discuss their study issues.

MOOCs represent the extreme approach of a *'single learner only' environment* where the student is entirely on his/ her own. Due to their large scale and high number of subscribers MOOCs cannot offer individualized guidance, support or qualitative feedback on assignments. MOOCs have been criticized for supporting predominantly passive learning, conceptually replacing the 'sage on the stage' simply by an anonymous automated system. Attrition rates are subsequently very high *(Tyler-Smith, 2006)* with a vast majority not completing courses, e.g., in one of Udacity's latest course *'Introduction to Computer Science'* only 1 out of 10 participants completed their studies. The record-breaking '*Introduction to Artificial Intelligence*' mentioned earlier had only a 7% completion rate *(Guzidal, 2012)*.

Advocates argue that such courses are not a zero-sum game and are not suitable for all learners, but the low completion rates still beg the question of the system's efficacy and extended public benefit.

The advantage of MOOCs is the efficient dissemination of content knowledge and practical skills at undergraduate level, especially for highly motivated students that aim to acquire specialized skill-sets. Operational costs on a staff-student ratio are relatively small. In order to reduce the high drop-out rates MOOC-providers have started implementing selection processes to boost completion rates. Student profiles are adjusted towards the educational program, not vice versa, rendering MOOCs unsuitable for weaker students or students from different socio-cultural background *(Parrish & Linder-VanBerschot, 2010*). *Justin Reich (2011)* asks if MOOCs decrease digital equity and disadvantage less affluent students.

'Single learner only' environments come at the price of focusing on content while bypassing creative problem-solving, social skills, innovative thinking, higher cognitive and meta-cognitive skills, relevance for real-world application, taking over roles and responsibilities, active research and its critical review *(Kim, 2012)*. MOOCs require the autonomy of strong, self-directed learners as a prerequisite for studies, but intrinsically do not foster autonomy and social relations themselves.

Image (above): *Typical online quiz format and status of completed challenges at Udacity (left), Syllabus presentation with video lectures, quizzes and assignment listing at Coursera (right)*

Dough Holton writes conclusively that *' "Connecting" learners to one another or exposing them to content may often not be sufficient to magically cause learning to happen or to cause significant changes in beliefs and practice.' (Holton, 2012)*. He criticizesthe presumption of merely descriptive connectivist' theories which do not take into account human properties such as social processes, intentionality, meaning (semantics), mental agency or phenomenological-subjective and inter-subjective experience. This is most likely the reason why MOOCs are more geared towards convergent rather than divergent problems. Typical courses offer studies in computer science, programming and software, web-development, data-analysis, algebra, statistics or accounting which are based on solitary, internal monologue and analytical intelligence. MOOC courses render less appealing for students looking for a sociable learning experience, posing questions of implicit gender- and cultural bias.

Examples for MOOCs: *Khanacademy, Udacity, Coursera, FutureLearn, edX, Open2Study, XuetangX*

Conclusion

In terms of improving education qualitatively on a massive scale **flipped classrooms and blended courses** hold the biggest promise for most schools and colleges around the world. Implementation can be achieved with moderate additional effort and investment but requires support and commitment from the institution's management. The approach is highly enjoyable while students' enthusiasm translates fast into positive outcomes. Blended courses pave the way for a widely employed *data-driven service design*.

Besides Higher Education, **tutor-based online learning** is making its inroads into the commercial sector and professional training. This includes for example workforce one-the-job learning *(Batalla-Busquets & Pacheco-Bernal, 2013*), corporate training *(Vignare et al., 2010)*, training of SMEs *(Roy, 2009)* as well as government staff *(McKay & Izard, 2012)*.

Online tutorial courses require continuing development of new course materials, the maintenance and development of a complex online platform and employment of qualified and reliable staff. Costs for set-up and maintenance are substantial.

Finally, **MOOCs** have justification in their own right for smaller numbers of specializing students. They are limited to courses employing more solitary learning styles. The argument that online learning systems need to be scalable seems to rest on the wrong assumption that the human mind works as a form of computing. David Gelernter notes that *'We don't think with our brains only. We think with our brains and bodies together. (…) You cannot "run" another mind on yours, and a third mind on that, and a fourth atop the third." (Gelernter, 2014).* Information technology is recursive, the human brain isn't. Online learning systems need to facilitate and enhance our mind's potential, not sacrificing it for the sake of computational efficacy. Online education, after all, is about developing and celebrating human minds and lives. The exciting debate on how to create the best online learning experience for the greatest number of students has just begun.

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