MINDTHEGAP(P)™: LEARNING EXPERIENCE DESIGN IN LIGHT OF THE MOOC CONTROVERSY

András G. Benedek[1,2]

[1] Hungarian Academy of Sciences, Resarch Centre for the Humanities (HUNGARY)
[2] MMATT Ltd (HUNGARY)

Abstract

Since Massively Open Online Courses (MOOC's) have emerged there has been a growing controversy over whether they are using the Internet to revive traditional models of higher education, or they are offering new opportunities to transform teacher-centered methodologies into student-centered technologies via connectivist learning design methodologies. In the current terms of the debate 'xMOOCs' can be considered as open access products of the knowledge market presenting interactive course materials in the framework of online teaching/learning platforms for large scale knowledge transfer. They can be contrasted with connectivist 'cMOOCs' (in Stephen Downes' terminology) which represent new paradigms of networked learning and collaborative knowledge generation. While xMOOCs were developed under the influence of the management history of Virtual Learning Environments and can be evaluated using benchmarks for online course design such as Quality Matters Rubric, or against specifications for modeling learning processes such as IMS Global's Learning Design (LD), cMOOCs call for new standards of networked learning.

This study argues that the rise of MOOCs has brought about a serious challenge for e-didactics. The challenge consists of addressing the gap between formal and informal learning in terms of participatory action theory based on principles of collective inquiry, experimentation and reflection. Large-scale interactive participation in networked learning faces not only a clash of conceptions between connectivist and instructivist approaches to learning design, it calls into question the very conception of activity design, at least in the sense of predesigned forms of learning activities providing the basic structure of a course. Thus, LD standards and Learning Experience Design (LXD) exchange position in MOOC didactics. The proposed conception of LXD lays emphasis on learning from experience and on new kinds of open participatory learning ecosystems that support active, spontaneous and adaptive learning. It underlines that didactic design is needed whenever explicit knowledge is presented or represented and individual learning is assumed, but points to the collaborative 'do-reflect-apply' character of experience design that is more suitable for networked m-learning. The discussion is based on the methodological conclusions of the EU supported MMATT project carried out within the framework of the New Hungary Development Plan (EDOP/GOP-1.2.1-11-2011-0003) developing MindTheGapp™, a multi purpose Mobile Learning Platform. It includes the VIDra™ v-learning module and a toolkit of online and m-learning Apps for bridging the gap between formal and informal learning providing a mobile multimedia based m-learning platform for teachers, students, study groups, and other communities preparing for tertiary education. Its reference model is based on learning services transforming the landscape of activity management by the introduction of the new Experience API (xAPI/TinCan). The xAPI provides information about the learning processes and records information about the learning activities in a Learning Record Store (LRS) that communicates with all kinds of smart mobile devices. LRS based activity tracking promote the use of a tentative set of associated web 2.0 – web.3.0 Apps that can be utilized by the adopters of the proposed m-learning model. Tracking the students' activities more closely promotes matching the students' needs and the core competencies in new forms of learning experience design.

Keywords: Learning Experience Design, Mobile Learning, MOOC, Knowledge Transfer, e-Didactics, Experience API (xAPI / TinCan), TLA, MindTheGapp.

1 THE xMOOC vs. cMOOC CONTROVERSY

Since Massively Open Online Courses (MOOC's) have emerged there has been a growing controversy over whether MIT Open Courseware, Khan Academy, Udacity, Coursera, and other current major MOOCs are using the Internet to revive traditional models of higher education, or they are offering new opportunities to transform teacher-centered methodologies into student-centered technologies via connectivist learning design methodologies. [4,6,8] There is less controversy about the fact that m-earning is transforming next generation learning habits and that connectivism enables educational innovation. Students' *personal* (not school provided) access to smart phones in 2013 was 65% at Gr. 6-8, and 80% at Gr. 9-12 in the US

ISBN: 978-84-616-8412-0

according to Project Tomorrow, and the rise of students' handiest access to knowledge is also unstoppable in other parts of the world. They use a wide scale of mobile Apps suitable not only for gaming but also for learning and practicing knowledge management skills. The 2013 NMC Horizon Report puts MOOCs and tablet computing on the one year or less Time-to-Adoption Horizon and underlines that "the demand for personalized learning is not adequately supported by current technology or practices." [p. 10]

In spite of being allied with m-learning, the main charge against commercial MOOC companies is that they are replacing "something undesirable with something worse": TA made tests and overhead projector lectures in overcrowded or sparsely attended lecture theatres, with watching lengthy broadcast-style video-lectures at home, reading mind-blowing PPTs and snippets from the screen without any hint and motivation (accept improving the test scores). Analyses point out that the rhetoric that MOOCs are for "self-directed learners" hides the fact that they largely present traditional instruction providing no personal interaction with the professor or, in the best case, offering such forms of tutoring which are not more extensive (let alone more interactivity-intensive) than they were in the mass educational practice of "brick and mortar" colleges.

The "MOOC Tsunami", as *Antoine Flahault* called it, hit higher education at the worst timing, just before e-learning standards and learning design matured for the better and we experienced the convergence of on and off-campus teaching in forms of blended learning and flipped classrooms. On line course tools which also moved towards m-learning like Moodle, have became popular at colleges besides Blackboard Learn; just as, Schoology, or Edmodo were getting widely used in K12 and secondary education. In result of its networked, mobile nature, ubiquitous m-learning represented a well accepted challenge to closed learning management systems and traditional didactic methods. In light of this challenge, it can hardly be denied, that the vast potential of mobile Apps, networked learning and connectivity is barely utilized by the mainstream MOOC providers and that their business models refute the gist of connectivist learning theories. [4, 14] Unlike xMOOCs which were developed under the influence of the history of LMS and video-based v-learning environments and can be evaluated using benchmarks for online course design such as Quality Matters Rubric or against specifications for modeling learning processes such as IMS Global's Learning Design, cMOOCs call for new standards of networked learning and evaluation.

1.1 The brand of xMOOCs considered as broad knowledge transfer tools

In the current terms of the debate 'xMOOCs' can be considered as open access products of the education market presenting interactive course materials in the framework of online teaching/learning platforms for large scale knowledge transfer. They can be contrasted with connectivist 'cMOOCs' (in Stephen Downes' terminology) which represent new paradigms of networked learning and collaborative knowledge generation. These courses can be categorized as "xMOOCs" which "are online versions of traditional learning formats (lecture, instruction, discussion, etc.) on proprietary specialist software platforms owned by private enterprises. They feature contractual and commercial relationships between Universities who create content, and technology providers." [4, p.11, cf. Fig.3 below] The "instructional model of xMOOCs is essentially an extension of the pedagogical models practiced within the institutions themselves, which is arguably dominated by the 'drill and grill' instructional methods with video presentations, short quizzes and testing". [6, p. 7] Although alternative criteria can be given both for the terms "Massive" and "Open" these terms minimally mean that anyone can take the course without preconditions, and in the worst case, might only pay to get credit trough an institution. The standard list of advantages of (x type) MOOC used to start with those of *ubiquitous learning* and free *access to top university education;* as it is illustrated by infographics, ads of the main providers and even by more detailed studies. [4,6,8] However, ubiquity, which these days is becoming equivalent to some form of simple mobile learning, is rather a consequence of the fact that most MOOC vendors have their own mobile App. Openness, in addition to its basic meaning that there are no preconditions and the registration is open, could also mean "open content", "free of charge", although (as it is expressed by the well known MOOC poster) it happens, that it means "affordable" depending on the business model. It is rare that the course content is freely reusable or is 'open' in the sense of giving permission to alter it or to distribute. Access to top university education is also not an inherent feature but a contingent component of the early history of the MOOC movement (related to such developments as MIT Open Courseware (cf. Fig. 3 below), and of the course of events that the main MOOC providers happened to find their main target market in those people who had faced permanently rising college tuition or had been subject to geographic inequalities. Recent public announcements and trends of MOOC topics already show that they started to look for alternative business models to their Higher Education (HE) centered initiatives. [8] Still, the main novelty of xMOOCs remains to be their "massive openness" in the sense of offering a form of "democratic" (i.e. non selective, non-segregatory) "quality education" on a broad global scale to every individual independent of their socio-economic or cultural background. The term "democratic" that is frequently used in this context has a connotation to individual rights to education. Connectivist cMOOCs, on the other hand, disrupt the conception of individual knowledge transfer which became associated with HE. From a historical point of view they return to the original conception of "*magistrorum et scholarium*" in new forms of Knowledge-Building Communities which democratize academic freedom at the community level.

1.2 Networked cMOOCs supported by connectivist learning theory

Opposed to xMOOCs, "cMOOCs" ('c' for "connectivist") which "emphasise connected, collaborative learning … provide a platform to explore new pedagogies beyond traditional classroom settings and, as such, tend to exist on the radical fringe of HE." [6. p. 7] The connectivist vision is concisely summarized by George Siemens who talks about open online learning as emphasizing "*creativity, autonomy and social networked learning*". Stephen Downes describes the essence of connected learning as "the creation and removal of connections between the entities, or the adjustment of the strengths of those connections. A learning theory is, literally, a theory describing how these connections are created or adjusted." [14] Sessions of cMOOC are massive classes, or rather 'collective events' of learning by doing which are not centered on a single teacher or knowledge owner who is transferring her knowledge to students. Instead, in a cMOOC environment the participants in the 'course' act as both teachers and students and work in a collaborative or cooperative way. They share information and engage in a joint teaching and learning experience through intense interaction facilitated by the available web-technology. This also means that the available tools are not limited by the services of the learning environment, or a low-tech classroom, but the stage of action is "flipped": considerable amount of work takes place outside the formal framework of the 'course', that is loosing its common meaning and is replaced by social networking, so that the participants can share mobile knowledge management tools, use information mining and analytic techniques. "Social interaction actually produces the content" (as G. Siemens put it) via the connections formed by the participants who are building a "distributed knowledge base" on the net instead of being based on the "established connections that the faculty member has created."

2 EMERGING AND DE FACTO STANDARDS

The past decade that preceded the emergence of MOOCs can be considered as the period of standardization of e-learning in result of the prevalence of online learning, the attention that the issue has gained, and the considerable support from governments and international organizations. A large number of practitioners, researchers, institutions worked on technical standards of interoperability, content management, resource discovery, accessibility, but also on instruction design and quality assurance standards. Besides the IEEE 1484.12.1-2002 Learning Object Metadata standard, or the IMS Content Packaging Learning Object Metadata (LOM), IEEE P1484.11 Computing Managed Instruction and ADL's SCORM Content Aggregation Model (SCORM 1.2) had become a *de-facto* standard while more complex and up-to-date specifications have emerged such as IMS Learning Design (IMS LD) and LAMS. Several governmental, EU and international e-learning and pedagogical quality standards and guidelines became available, (like e-Excellence or Quality Matters Rubric) while on the teacher's side best practices and new initiatives suggested considering instruction as a "design science". [10] Before the issue could have been settled whether we have arrived at standards that are "simple enough to follow and flexible enough to allow for creativity" [11] *m-learning* and video based *v-learning* transformed the landscape of e-learning. Both in Europe and oversees, new generation of standards are emerging to handle the task of connecting various learning resources and activities over the Web such as IMS Common Cartridge, Learning Tools Interoperability (LTI), Learning Information Services and ADL's Training and Learning Architecture (TLA). Whether these emerging standards enrich the MOOC movement with technologies that expand the currently applied pedagogical models, or MOOCs impoverish the aspirations set by these standards by reducing the complex galaxy of learning into a flatter world remains an open question.

2.1 The idle standards that you praise

In spite of providing a comprehensive formal language that is based on a general meta-level terminology for analyzing learning and teaching activies, IMS LD never became as widely used "de facto" standard as SCORM 1.2. Its expressibility, preserving the legacy of educational meta languages such as EML and eLML, was designed for analyzing and describing these activities and recording them in the form of reusable meta models that are machine-understandable for LCMS based Learning Environments. The problem was not so much that the run time parameters of the Communication Services, the Roles of the participants, the Tools which are used, the Properties of learning contents, and the Activities of the participants of the knowledge transfer process tied Learning Design (LD) to LCMS technology, and that the integration of newer web services required some extra implementation effort, but among others, that the management of web resources, Facebook accounts or social plugins, had to be pre-designed in a manner that not suited the flexible spontaneous way of the net generation's usage of the web. Although it was suitable for designing complex group activities or even game based scenarios, the technicalities which were aiming at the simultaneous goal of producing reusable meta models and code for the LCMS engine turned out to be diffusion barriers and the goals and the LD vision became ripe for review. [7,12]

The idea of providing a framework that is based on LD was pursued by James Dalziel and led to the more user friendly LAMS and LAMS2 Learning Activity Management System which also included a handy Visual Authoring Environment, Tool Adapters, a Video Recorder, and offered knowledge organization services like Mind Map for the members of the LAMS community. The latter consists of more than 8000 members sharing over 1000 learning sequences world wide who revitalize the idle standard of LD in terms of the Larnaca Declaration, so LAMS has got integrated in leading LMSs and Virtual Learning Environments (VLEs) from Moodle, Sakai, to MS Share Point.

The connectivist conception of cMOOCs, however, requires even more flexible mobile Social Learning Management Systems (mSLMS), capable to integrate users' Personal Learning Environments (PLE) and other Web2.0 technologies in the spirit of the Open Educational Resources movement. The trio of the newest IMS specifications mentioned in the previous section moves in this direction while ADL's TLA turns the problem of integration inside out: the integration of web services takes place not within the LMS but *vice versa*, the services of the (preferably cloud based) LMS may be integrated into our PLE or the social environments of networked learning. Since the activity tracking component (xAPI) of TLA does not need an LMS to manage and report activities, web content and PLEs can be integrated (using microblogging technology for example) in smart mobile environments without difficulty. Hence, *inverting the scope of integration,* Wikipedia, OER, web 2.0 services, Prezi presentations or Glogster online multimedia posters (GLOGS), Youtube, TED Talks, online Quiz Services or even Udemy, Kahn Academy or Coursera itself can all be incorporated into the toolkit of connectivist Knowledge-Building Communities. At the moment it is difficult to predict what progress can be expected by the time all the four components of the TLA will be published. Since the effective use and integration of such a toolkit requires that the applications implement the "Experience Tracking" component of the TLA (the xAPI which communicates with the LRSs, see below) we have to wait until App developers catch up, and recognize that it is their interest to comply with the TLA specification.

The design of such xAPI-based '*inverted*' learning spaces implies that we change our approach to learning design. Instruction oriented activity design in a cMOOC environment gets limited to presentative activities and certain explicitely instructive components of the learning space but the general design of the processes and goals of collaborative networking must quit the idea of tight activity design (as the linear sequencing of tasks), since its value points assume unexpected discoveries, alternative learning paths, and creative work that depends on the variable steps of individual and collective knowledge discovery. Considering the projections based on the next generation learning habits [3, 7] and 'user-led education' it can be expected that the LCMS based approaches of LD or LAMS2 will be gradually exchanged by the more general approach of *Learning Experience Design.* (LXD) As students and communities are placed at the center of the learning process as organizers of their own activities, problems of usability engineering and interface design, and the applied UXD models become similar to problems of designing effective technology-based eXtended Web (2.0-3.0) based PLEs. [14] The usability problem no longer lies in the design of a particular learning interface, or application, but rather in the composition of the collective mass of resource aggregators and interfaces.

Just as Constructivism and Connectivism serve as the theoretical background for the cMOOC practice,

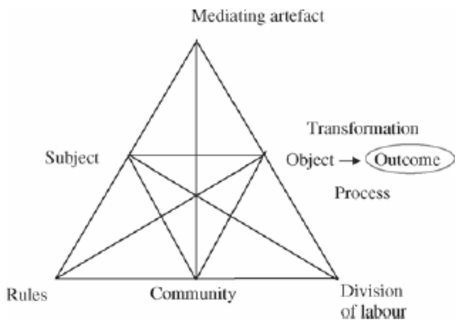

Fig. 1 The basic structure of an activity in the conception of participatory Activity Theory [from 15, p. 86]

Activity Theory is recently reconsidered as a suitable conception for designing networked PLEs and for the understanding of the practice of mobile learning. [2, 14, 15, 16] These approaches together lead to the recognition that in addition to technological standards of interoperability and activity tracking new e-didactic methods and tools are needed which help the learner make sense of information, find applications and resources in the process of collective problem solving and context of discovery. Socially Distributed Cognition [17] assumes the design of connected learning spaces for sharing our collective human experiences. Their implementation requires flexible programming paradigms for the bootstrapping of adaptable knowledge architectures which can be refactored by their users as needed in order to communally or publicly share their insights and didactically redesign their learning paths to aid the learning and interest of others in various adaptive forms.

2.2 E-Didactic Standards Wanted

The rise of MOOCs has brought about a serious challenge for e-didactics. For xMOOCs, the challenges consists of addressing the gap between formal and informal learning building upon the accumulated best practices of e-learning and v-learning and enriching its criticized ‘traditional’ instruction methodology by the potentials of mobile technology which readily allies with immersive learning and GBL. The challenge for cMOOCs consists of providing a methodology of *effective* distributed knowledge creation. It is a long row to hoe until distributed cognition can be anchored in the domain specific methodologies of different fields and diverse subjects. It’s not enough to have general principles of collective inquiry, experimentation and reflection derived from constructivism, connectivism and participatory *action theory*. Subject specific tools and methods can be combined in more effective ways than current cMOOCs display and we must accept that different subjects from math to art history, moreover specific problems and levels of immersion, require different methods and learning styles. Large-scale interactive participation in networked learning faces not only a clash of conceptions between connectivist and instructivist approaches to learning design, it calls into question the very conception of activity design, at least in the sense of predesigned forms of learning activities providing the basic structure of a course. Thus, LD standards and Learning Experience Design (LXD) exchange position in MOOC didactics. The proposed conception of LXD in [7] lays emphasis on learning from experience and on new kinds of open participatory learning ecosystems which support active, spontaneous and adaptive learning. It is important to underline, however, that didactic design is needed whenever explicit knowledge is presented or represented and assisted individual learning is assumed. LXD is a close mach for the collaborative 'do-reflect-apply' character of cMOOC-ing and can be applied as a general methodology of networked m-learning. Our preliminary research results and first experiences with MindTheGapp™, a new knowledge market integrated VLE (capable of running a MOOC) which is developed in the framework of the Economic Development Operative Program of the New Hungary Development Plan [3], revealed that addressing the gap between formal an informal learning and providing a toolkit to prepare for higher education requires alternative approaches to MOOC design. Our conclusion complies with the main point of Guàrdia *et.al.* [8] that the debate on MOOCs “is much more focused on the social, institutional, technological and economical aspects than on the need for development of new pedagogical approaches that provide consistent guidance on how to design for this emergent educational scenario.” It has to be added, that the statement is to be applied to both forms of MOOC. Since both x’ and cMOOCs are in a premature state with respect to elaborated methodologies, it is crucial to provide opportunity for the participants of the knowledge transfer and knowledge building processes to experiment with the combination of different pedagogical approaches in the framework of x’ as well as in cMOOCs.

2.3 Ex ante and ex post the “Experience Api”

The Aviation Industry Computer-Based-Training Committee (AICC) joined the initiative of ADL and the xAPI specification is now developed as a component of AICC’s CMI-5, the next generation eLearning interoperability specification intended to replace the existing AICC & SCORM specifications. According to its official announcement “ADL is focusing its research efforts on a next generation online learning environment called the Training & Learning Architecture, or TLA. The TLA will provide learners with richer and more innovative learning experiences. TLA component capabilities will include experience tracking, content brokering, content ‘understanding,’ learner profiles, and competency networks. The experience tracking, which we refer to as the ‘Experience API,’ is the initial phase of the TLA.”

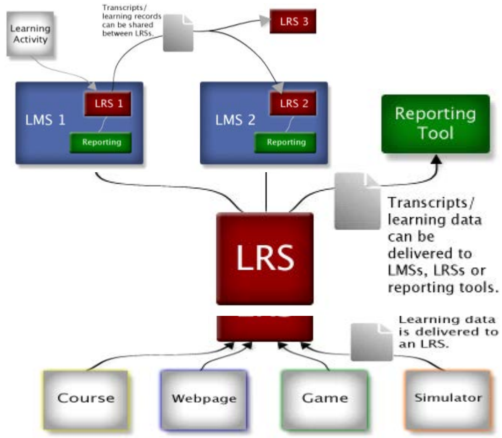

Fig. 2 xAPI communications with the LRS (Compiled from the descriptions of Rustici Software)

The xAPI is a service API for handling activity streams (e.g., JSON, or Atom) generated by different learning services. It exchanges information about the learning processes and links educational tools incorporating functions of activity tracking. It records the information about learning activities into Learning Record Stores (LRS). It can work with multiple LRSs, admitting communication with LRS servers in the Cloud, with a corporate LRS, with the administrative information store of educational institutions or a private, personal record locker. Using its communication protocol the LRSs are able to talk to one another and the information can be passed between them storing and requesting activity streams. What the xAPI sets out are the parameters and rules for passing data statements about the user’s learning activities from one application to the LRS and back, so that it can make sessions possible with other Apps.

Its ‘statement’ sub-API tracks the learning records while Learning Activity Providers can use its ‘state’, ‘agent profile’, and ‘activity profile’ sub-APIs for extracting and providing information that is needed for creating dynamic web 3.0 learning environments. “Any device can connect to the xAPI which records learning experiences which can take place outside or inside an LMS, collects information from mobile devices (automatically or at the learners prompting), including reports of real world activities.The devices that are used can be camera-phones, sensometers, GPSs, even sonar devices or gyroscopes, enabling simulations, the combination of real life activities with rich media or augmented learning.” [7] The records from diverse sources which are feed to the record store consist of data about the type of the activities (e.g. reading an e-book, watching a YouTube or Khan video, flying with a flight simulator, participating in a webinar, communicating with one’s Mentor, using Apps from Google Play) including the parameters of the sessions, their the duration, the achieved score, success or completion levels, assessments, etc.

We are yet in the “ex ante” period of the introduction of the full spectrum of the new specifications. The1000s of Apps which can be utilized in preparation for the SAT, for example, Mathway, Periodic Table, History: Maps of World, or Math Ref can be integrated only if the developers understand the methodological importance of applying the new interoperability standards, and incorporate the xAPI into their Apps. Even if time works for the technological extension of MOOC frameworks and for the integration of mobile Apps into didactically traceable interoperable forms, the TLA set of specifications will not fill the void in MOOC didactics since the users need methodological support for the effective combination of these tools, and especially, and await for context and domain dependent e-didactic reference models for collective knowledge building which will be in demand in the “ex ante” period of their publication.

3 METHODOLOGICAL CONSIDERATIONS OF THE MMATT PROJECT

Since the preliminary specifications of the required features of a multi purpose Mobile Learning Platform coincided with the purposes of the Experience Tracking module of the TLA, in the framework of the EU supported MMATT (Mobile Multimedia based Knowledge Transfer) project a great deal of activity was devoted to exploring the possible e-didactic scenarios from the point of view of the future prospect of implementing further components of the TLA. The application of the xAPI and an LRS opened the way for accessing OER and m-learning Apps and for the user returning to the recommended scenarios. Meanwhile student tracking can assists the course provider to adapt them to personal needs and to assess progression. It was a basic methodological principle that MindTheGapp™ must rely on social sites for distributed cognition, communication and learning group formation. It did not seem reasonable to duplicate services. Since we wait for the publication of ADL’s *Learners Profile* and *Competency Infrastructure*, having a go for “ex ante” software development for these components of the TLA were too early. Since preliminary learning market research confirmed that there is a considerable gap in m-learning and MOOC support between secondary and higher education (especially in Europe and other parts of the world in comparison with the SAT trained US market), we concentrated on the fourth component of the TLA: Content Brokering.

3.1 A Knowledge Market for Small, Private Online Courses

We detected an inclination among pre-high school students and teachers, language schools, but also among field specialists, game, and content developers to adopt cloud based services like MindTheGapp™ into their teaching and course development practice. This confirmed that a marketplace of learning and teaching services can rely on the contributions of Global Teachers, content developers and active students who are ready to bring their intellectual products to an open knowledge market. The online marketplace implemented in MindTheGapp™ as a prospectively extendable knowledge market for Small, Private Online Courses (SPOC, cf. [20]) and its components serves their purpose. Their willingness to use MindTheGapp™ both as a tool of blending instruction or "flipping the classroom" and as a VLE that helps preparing students for HE contributes to closing the gap between formal and informal learning and between students' in and out of school digital use and competence of m-learning.

3.2 Narrowing the Gap between Formal and Informal Learning

The ESSIE Survey [5] of the European Commission's DG Connect detects robust separation of "in school

formal setting" and "out school, informal/non formal settings" with respect to the use of m-learning, the utilization of digital competencies, and user created content. Over the last few years, as the goal of matching market demands and educational services has become a 'Strategic Imperative for Business', *informal learning* has also been on the rise as an increasingly important factor in career development. The growing impact of informal learning on job market efficiency explains why *filling skill and knowledge gaps on an as-needed basis* in personalized preparation for tertiary education is key today to successful career planning. [2]

Considering the market demands, the starting point of the reference model of MindTheGapp™, was to build a *bridge between formal and informal learning* by a comprehensive *toolset* for *knowledge transfer anywhere, anytime*. Its rationale was "to *bring together students, teachers, knowledge workers and digital content developers in a cooperative environment providing a marketplace for their intellectual products*." [3] Raising student expectations through the potentials of m-learning MindTheGapp™ may take the position of an indirect contributor to the line of connectivist MOOCs if it is used as a toolkit for Small, Private Online Courses [SPOC] which may become components of larger cMOOCs or distributed learning set ups. Since its development was influenced by the methodological conclusions drawn from the current didactic problems of xMOOCs it can be integrated into the PLE of a networked learner who participates in collective knowledge building and complements her open educational resources and mobile applications from the knowledge market or into the educational service kit of a teacher or content developer who is taking his intellectual products to the same market. From the logic of distributed cognition it follows that they can change roles without a hitch, since this option is a built-in feature of MindTheGapp™.

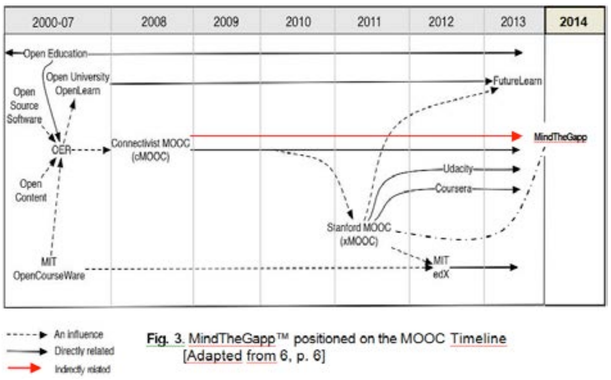

Fig. 3. MindTheGapp™ positioned on the MOOC Timeline [Adapted from 6, p. 6]

3.3 Bridging the Gap between Secondary and Tertiary Education

Apparently there is another gap in MOOC supply between *secondary* and *tertiary* education even in the US where the majority of MOOCs comes from universities. [6] The European MOOCs Scoreboard records only 442 European MOOCs (ATTOW), mostly related to higher education. The June issue of the MERLOT *Journal of Online Learning* [Vol. 9, No. 2], or the the Summer issue of the Research and Practice in Assessment Journal [Vol. 8] devoted to MOOCs and Technology, reflects the HE tendency of MOOC research as well. Contrary to this tendency, in the R&D phase of the MMATT project, the potential of addressing the needs of next generation mobile learners *in the transition period when secondary students become global learners* was a declared constitutive component of the reference model of MindTheGapp™.

3.3.1 *Providing a Global Habitat for Teachers and Students for College Preparation*

The reference model is centered on a community conception of global educators and mobile learners. It offers a content development environment to edit a course and/or teach a class online in an autonomous manner making personalized mobile learning available for students preparing for higher and further education. Teaching and learning in its framework lets the participants of the knowledge building process to decide for themselves which courses or modules they need or how their learning paths and milestones should be structured and it makes cooperation and sharing learning experiences with others possible.

While there has been progress during the past two decades, there are still barriers to college preparation for students in various fields and geographic and demographic areas. The typical challenges include: preparation in advanced math, collegiate literacy preparedness, foreign language skills, easing concerns about the costs of preparation. MindTheGapp™ is committed to rise to these challenges by providing a mobile knowledge transfer environment that attempts to overcome the separation of formal and informal learning bridging the gap between secondary and post secondary education by m-learning methodology.

A closer analysis of the current MOOC trends in the beginning of the project, pointed to the importance of skill specific, competency based, content dependent learning design especially in the field of college preparation and further education. There is no elaborated MOOC methodology for this transition period even though considerable interest started to turn in this direction after the initial hype of HE centered MOOCs. [8] Considering this critical period, one conclusion of the "MOOC Tsunami in HE", may be that they can help to bridge the gap between secondary and higher education and provide transition-support for college success. Insofar as the innovative potential of *networked m-learning* is utilized in informal learning settings *before students enter HE*, their digital practice may raise expectations with respect to the applied learning technology and teaching methodology in HE, hence, their demands can also strengthen academia.

3.4 Resolution of the xMOOC vs. cMOOC Opposition

It is often argued that the two type of MOOCs are like fire to water; so much so, that cMOOCs cannot even be called courses since the term is just a residue of the "course" parlance in HE. But there is more at stake than teaching methods and their tags. The story is about self-serving entrepreneurs' globe-trotting "sideshow" commercializing higher education versus pioneering "learning communities" who are exploring the new world of networked critical reflection and "collective knowledge creation". The main x' providers have got accused of wrecking the cMOOC paradigm, taking some technical valuables from the ship ashore to the old land of investments. The emergence of commercial xMOOCs was arguably a new headwind for the cMOOC movement and to avoiding drifting ashore, the connectivists' reaction was not always constructive when they pilloried the xs' first business models, technical solutions and their adopted pedagogical methods. Take notice, however, that the headwind is beginning to change course: vendors are interested in making their product better and experimenters from the field report that "collocated" MOOC based learning can make MOOCs "more social than you believe". [9] Although Coursera reserved the right to make modifications to their MOOCs or to base a face-to-face class around their MOOC, there are other winds blowing which support a hybrid model of classroom flipping and new ecosystems are emerging which accept that in open education we need different pedagogies for different learning objectives. [1, 2].

3.4.1 *The Right Content to the Right Student in the Right Context*

Although MindTheGapp™ is in test phase (ATTOW), we foresee that users will mix pedagogic approaches in different ways. In a state of reading, writing, or thinking about a problem students need different tools than in the midst of knowledge sharing. Some prefer visual knowledge organization others enjoy and memorize verbal communication and take video lectures as good account. Since learning styles are different and depend on the topic, experiences with a group of secondary school teachers and experts in e-didactics led the MMATT project to looking for alternatives of the 'x' and 'c' opposition. The "flipped classroom" model originating in Harvard and first adopted in university teaching turned out to be adaptable not just to F2F classes but also to virtual classes in various subject dependent settings for college preparation. Considering social sites and mobile apps for collaboration as proper channels for peer interaction, the virtual space of the course can serve as the locus for coaching, mentoring, and providing basic contents and didactic components which complement the standard services of xMOOCs.

3.4.2 *Extending the 'flipped classroom" model to "inverted" virtual classes*

Inverting the scope of integration in a way as described in section 2.1, means that the work accomplished in an xMOOC can be embedded into a group cMOOC activities and vica versa: xMOOC activity streams can be interrupted for cMOOC-ing. The actual use cases admit the application of MindTheGapp™ as an 'inverted' learning space (to the analogy of flipped classroom) where the presentation of some basic course materials takes place and students receive methodological and didactic orientation. These materials may be processed, God forbid, even individually, but it is assumed that the learners will include MindTheGapp™ into their mobile or desktop PLE and social networking set up. New tasks and materials can be made dependent upon achieving milestones, but functional, self test based benchmarking can make suggestions for collective work, data collection, or open collaboration in cMOOC style. In this combined model it depends on the ratio of x'/c' and on the pedagogical emphases – what is integrated into what. Social networking tools may be integrated into xMOOC framework and their use may become a didactically designed task, or pre-composed x-course components may become resources for creative and cooperative knowledge building, say, in a cMOOC's microblog. Technically the integration requires interoperability in both directions a trend that is accelerated by mobile technology.

3.4.3 Apps for filling the Gaps: a toolkit based on next generation standards

The combination of the two approaches (x' and c') can be supported by Mobile Apps like Study Buddy College Study Buddy and collaborative tools such as Google Docs Collaborative Editing, Hangouts, Mighty Meeting, Edmodo, GoObserve™, OpenClass, , or WordPress, Tumblr, Lucidchart, Instagrock, Voice Thread, iAnnotate, WikiNizer, Pearl Tree, and many others, utilizing the connective feature of smart devices that suites the learning style of "next gen" secondary students. The *extra 'p'* in *MindTheGapp™* refers to both the option of integrating further Mobile Apps into its toolkit and to MindTheGapp™-mobile itself, having been treated as a Learning App which can be integrated with other applications. The extension of MOOC capabilities by mobile Apps opens the perspective of associating the basic xMOOC services with web 2.0 –web3.0 tools. Using smart devices for community engagement teachers and students should be capable to use the toolset of MindTheGapp™ together with various knowledge management and collaborative Apps turning its integrated video modul, for example, into a collaboratively discussible media of v-learning. Since course authors must be able to combine resources and services from a variety of sources, something like edX's XBlock component architecture is strongly needed. Consequently we expect that a specification like XBlock may soon join the next generation of *de-facto* standards. A combined mobile educational ecosystem should be able to offer this option and to track the learners' activities through an LRS. Allied with the implementation of the new xAPI specification the next generation of standards makes the model of active m+v-learning complemented with mobile Apps realizable. This model may reconcile cMOOC practices with xMOOC production making their e-didactically positive components compatible with each other. The greatest challenge of the day is: how to combine the two forms MOOCs and bring about a learning revolution on the users' side (meaning here all the participants of knowledge transfer and creation), a revolution which takes place in our living room, in our offices, on our playgrounds as well as in our established education systems.

3.5 A Combination of Existing and Emerging Standards for an 'XC'

3.5.1 Implementing the xApi and an LRS for mobile activity tracking

Our starting point was that the realization of personal learning paths needs m-learning support since students in the college preparation period are at a turning point which represents a significant change in user expectations with respect to the applied learning technology and teaching methodology. We were convinced that learning-paths are not only metaphorically but literally the way to go and that it is essential to provide tools for the teachers for editing tasks, activities and content in a *conditionalized* way with milestone dependent tasks and preconditions for alternative learning paths. We also projected that the implementation of a Cloud-based LRS will be a firm technological basis for *learning analytics* which promotes the future development of the MMATT knowledge transfer framework in the direction of *adaptive learning*.

3.5.2 Touch Navigation, QTI, and a Graphic Editor for Course Authoring

The methodological conclusions we have drawn from the need of providing didactic support for editing learning paths during course authoring included the development of a graphic editor. The known tension between the advantageous functionality and the relative complexity of Learning Design (LD), the implementation problems of adapting it to mobile learning led to usability requirements which forced simplification. A LAMS2 style graphic editor [cf. fig. 4.] seemed to be suitable for the composition of alternative Milestone dependent learning scenarios. Milestone dependent tasks and content objects can be organized into Units of Study and the same tool encourages adjustments, customization and the inclusion of collaborative tasks which can be carried out via mobile collaboration Apps. Interviews with students confirmed that next generation learners intend to realize their personalized learning paths using their smart devices, hence, tend to interrupt the activity sequences using communicative and search features of their device. Just as global educators they are happy to share their learning experiences with others, insist on collaboration and access OERs for user generated content. Tracking learning activities in an m-learning framework required the implementation of a LRS and the so called “next generation SCORM standard”, the xAPI or, so called, ‘Tin Can’. Since the Tin Can statements about the learning activities on mobiles are tracked by the LRS the learner can continue her training activities on mobile devices anywhere anytime no matter where the learning process was started. [7]

The research phase of the MMATT project also confirmed that both formative and self assessment requires the implementation of IMS Global’s QTI specification. We also considered the adaptation of IMS Common Cartridge and LTI, however, at the moment we see the potential of the xAPI for further development of current xMOOC environments more promising for the integration of a wide range of mobile Apps with the MOOC frameworks and count on the further components of the TLA (Learner Profiles, Competency Networks) for designing didactic models and a recommendation system for *adaptive learning* based on learning analytics and accumulating data about user practices.

3.5.3 A v-Learning Module for Innovative (v+m)-Learning Models

The basic toolkit of MindTheGapp™ incorporates the VID^{ra} video module capable of *automated recording* of lectures, or *collective learning processes* and *demonstrations*. [3| It can record automatically and display in a presentation-window simultaneously with the video stream every screen change that takes place on the teachers’ device. It facilitates meta level *reflection*: after recording users can *analyze* their stuff, retroactively *assess* their activities and *interact* with their own recorded artifacts let it be a visual presentation of an experiment or any demo material shot at an external location. Shooting their own films, using mobile Apps, like WeVideo Magisto, Instagram Video, Vine, or Pinnacle Studio, students themselves can create video-records of their learning experience or field work *via* smart devices and co-edit the records (e.g., collections of pictures of plant species, clips of animal behavior, or situational practices in foreign language learning) to a suitable form for further study and investigation” in the VID^{ra} framework [3, p.1932]. Conting on production techniques described in this paper and in former reports [7] we expect that the integration of MindTheGapp™ and the VID^{ra} module will work as a generator of innovative (v+m) learning models saving the legacy of the LD-type representation of pedagogical knowledge.

Fig. 4.1 Graphic Editor for Course Authoring, and Touch Navigation of MindTheGapp™

Fig. 4.2 Edit- and m-Play views of the VID^{ra} v-learning module.

ACKNOWLEDGEMENT

Contribution was published thanks to the financial support of the Economic Development Operative Program of the New Hungary Development Plan (EDOP-1.2.1-11-2011-0003). The views expressed in the paper are the author’s and do not necessarily reflect the views of EDOP or EC.

HUNGARY'S RENEWAL
The projects are supported by the European Union and co-financed by the European Regional Development Fund.
NEW SZÉCHENYI PLAN

REFERENCES

[1] van der Woert, N. (2013). Ecosystems for Open Education: Trends and Opportunities by Nicolai In Jacobi, R., Jelgerhuis, H., & van der Woert, N. (Eds.) Trend report: Open Educational Resources.

[2] Beetham, H., & Sharpe, R. (2013). An Introduction to Rethinking Pedagogy. In: (Id. eds.) Re-thinking Pedagogy for a Digital Age: Designing for 21st Century Learning. London: Routledge.

[3] Benedek, A.: Mobile Multimedia-based Knowledge Transfer: a Toolkit and a Reference Model. EDULEARN13 Proceedings, 2013. pp. 1926-1936.

[4] HAGGARD, S. et al.: The Maturing of the MOOC. BIS research paper No. 130. Department for Business, Innovation and Skills. Gov. UK. (Accessed: 11.07, 2013)

[5] European Schoolnet and University of Liège (2013). Survey of Schools: ICT in Education. https://ec.europa.eu/digital-agenda/en/survey-schools-ict-education (Accessed: 11.07, 2013)

[6] YUAN, L and POWELL, S. (2013.) MOOCs and Open Education: Implications for Higher Education, JISC-CETIS report 2013. http://publications.cetis.ac.uk/ (Accessed:10.13, 2013)

[7] Benedek, A.: Learning Design versus Learning Experience Design: Is the Experience Api Making the Difference? EDULEARN13 Proceedings, 2013. pp. 2609-2621.

[8] GUÀRDIA, L, MAINA, M. and SANGRA, A. (2013). MOOC Design Principles. A Pedagogical Approach from the Learner's Perspective. eLearning Papers, N.º 33, May 2013.

[9] Blom, J., Verma, H., Li, N., Skevi, A., & Dillenbourg, P. (2013). MOOCs are More Social than You Believe (No. EPFL-WORKING-190099). eLearning Papers.

[10] Laurillard, D. (2012). Teaching as a design science: Building pedagogical patterns for leaning and technology. New York: Routledge.

[11] Welsch, E. (2002). SCORM: Clarity or calamity? Online Learning Magazine. 07(1)

[12] Neumann, S., et.al (2010). Report of the Results of an IMS Learning Design Expert Workshop (Complete Version). International Journal of Emerging Technologies in Learning, 5(1).

[13] Fox, A. (2013) From MOOCs to SPOCs. Communications of the ACM, Vol. 56 No. 12, pp. 38-40.

[14] Downes, S. (2012). Connectivism and Connective Knowledge: essays on meaning and learning networks. National Research Council Canada. (Accessed:10.13, 2013)

[15] Uden, L. (2007). Activity theory for designing mobile learning. International Journal of Mobile Learning and Organisation, 1(1), 81-102.

[16] Barab, S., Schatz, S., & Scheckler, R. (2004). Using activity theory to conceptualize online community and using online community to conceptualize activity theory. Mind, Culture, and Activity, 11(1), 25-47.

[17] Hollan, J., Hutchins, E., & Kirsh, D. (2000). Distributed cognition: toward a new foundation for human-computer interaction research. ACM Transactions on HCI (TOCHI), 7(2), 174-196.