

# Competency-based education: leveraging educational technology to support emerging economic demands

*Margaret Korosec, University of Hull, UK*

*Paul Bacsich, Sero Consulting, Sheffield, UK*

**ABSTRACT.** The rapidly changing landscape of the economy and technology demands an innovative lens to view the educational needs for the future. If deployed effectively, technological applications can enable students to learn independently of time and space and the monopoly of traditional seat-time requirements may need to be supplemented with models that support a broadening student profile. In some universities, a robust online learning resource and the employment of learning analytics has been found to foster student retention and improve completion rates. This paper will explore a competency-based higher education model in the context of the Bologna Process within the European Higher Education Area.

**KEYWORDS:** *Competency-based education, Educational technology, European Higher Education Area, Higher education, Technology enhanced learning (TEL)*

## Introduction

This paper will provide insight into the drivers, conceptual framework and evolution of competency-based education. It will share examples of technology-enhanced learning and fully online learning that have been used successfully alongside competency models in higher education environments. It will conclude with some implications for the possible expansion of competency-based education in the context of the European Higher Education Area. The Organization for Economic Co-operation and Development (OECD) research suggests the need to better understand existing and required skills and competencies as students of all ages transition from education to work. They are extending their work through the forthcoming OECD Survey of Adult Skills, which is an outcome of the Programme for the International Assessment

of Adult Competencies (PIAAC) (OECD, 2013). The impact of this forthcoming report has yet to be seen, though it does indicate increased awareness of the challenges and opportunities new models of education, including development and recognition of competencies, may offer. The most recent report on education published by the OECD makes a strong statement:

During the recent economic crisis, some young people postponed entry into the labour market and remained in education. Some governments have also developed second chance programmes, aimed at people who left school early, to raise the level of skills available in the workforce and increase opportunities for people to acquire practical education and competencies. Nevertheless, entering tertiary education at a later stage is more costly from both public and personal perspectives. It means that for a period of time, the productive potential of individuals is untapped. As a result, tax revenues are lower and public expenditures may be higher. Older students may face more difficulties combining work and study and thus may be unable to complete the programmes on time. Understanding that delays in completing education increases the cost of providing it, governments are introducing measures to foster timely completion (OECD, 2013, 293).

## **Competency-based education**

It is relevant to begin a discussion about competency-based education by first defining it. Competency-based education is not a new concept and parallels in the European tradition of vocational schools, polytechnics and universities of applied sciences can be found. The shift in the past decade appears to be in the way that competency-based education, paired with technology, serves a new and emerging educational need.

Some of the drivers for this model include, but are not limited to: serving adults with some education but no degree; recognizing prior learning; accessibility; flexibility for self-paced learning; reducing cost of degree completion by allowing acceleration; and conferring degrees that are in demand. By recognizing existing skills and

1. Note specification of  
“learning” vs broader term  
“education”

knowledge, students focus on the competencies they need to learn and not on the duration pre-determined to complete a degree. The momentum for competency-based learning escalated in the United States and, in 2011, a summit on competency-based learning was arranged and co-sponsored by the International Association for K-12 Learning (iNACOL) and Council of Chief State School Officers (CCSSO). Although the sponsors stemmed from secondary education, their purpose was to bring leaders from secondary and post-secondary institutions together to formulate agreed terminology and to document the principles upon which it is based. One major outcome of the convening was the following working definition of competency-based learning (Sturgis, Patrick, et al., 2011)<sup>1</sup>

- Students advance upon mastery.
- Competencies include explicit, measurable, transferable learning objectives that empower students.
- Assessment is meaningful and a positive learning experience for students.
- Students receive timely, differentiated support based on their individual learning needs.
- Learning outcomes emphasize competencies that include application and creation of knowledge, along with the development of important skills and dispositions.

It is important to note that while not specified in the working definition, there are both academic and skills focused competencies that may be incorporated into a competency-based, higher education model. This flexibility and broad interpretation allows innovators, leaders and policy makers to address the needs of their country, region or student population in order to prepare students appropriately for successful transition to the workplace. Some would argue, however, that more moderate approaches of new educational models are more sustainable (Bacsich, 2012).

The use of technology is also not explicit in the above definition. Competency-based education combined with educational technology enables a shift in focus away from time- or seat-based requirements to new models. For clarification, time- or seat-based mandates refer to required, class-time attendance, usually during face-to-face lecture. An acceptable number of nonattendances

are generally allowed before the student is required to officially excuse an absence. Several of the theoretical issues connected with seat- and time-based measures of education were explored in Bacsich (2011).

Although this paper is not intended on being a global overview of time- or seat-based requirements, it is worth noting seat-based restrictions operate in several countries and are regarded as inhibitors of TEL. For example in Brazil, all post-secondary diplomas and degrees are not more than 20% distance delivered and face-to-face requirements for milestone events are still in place (Porto, Berge, 2008).

## **Technology enhanced learning**

Technology enhanced learning (TEL) has wide interpretation, including blending traditional instruction with digital assets such as freely available open educational resources (OER), video, applications accessible through mobile devices, computer-mediated material, simulations and educational gaming, to name but a few. Whereas the traditional university may seek to enhance the face-to-face teaching environment with the use of technology either as part of the classroom experience or as an independently accessed resource out of the classroom, another higher education model may employ technology as the basis of delivering content to support fully online, self-paced and asynchronous learning with mentor support (Graham, Woodfield et al., 2013; Jenkins, Browne et al., 2011; WGU, 2013c).

Challenges arise in transitioning to TEL, since learning independent of time and space directly conflicts with seat-time requirements. Informal learning opportunities for on-demand learning are increasing however (Allen, Seaman, 2013; Pace, 2013). These seem to be addressing a shift in the market and the need for flexibility and self-directed learning. The rise of open educational resources (OER) and MOOCs (massive, open, online courses) serve the adult learner wanting to learn even if they do not earn a degree. Completion rates are rather low but this may increase as alternative systems recognizing work completed are implemented (Clow, 2013). Some of these systems recognize work achieved through professional development credit or the possibility of earning a virtual

“badge” that confirms an online course has been satisfactorily completed.

Technology can be incorporated to support and enhance a more flexible learning environment. Online resources enable formative assessment that can be integrated at the topic level of the content providing students with instant feedback. With the mediation of a mentor or coach, this feedback with mentor or coach support can be used to support adaptive learning, such as providing additional resources that enhance learning or more challenging options for those who quickly grasp a concept.

Tracking student progress in online environments or through formative assessment better guides students to successful degree completion. By acknowledging subject mastery and allowing the student to progress, or even accelerate, completion as well as earlier entry into the workforce is supported and encouraged.

Research on technology enhanced learning, learning analytics and competency-based education is growing but research is still limited on practical examples. There is considerable research on technology enhanced learning, some published works on learning analytics coming out of designated conferences, and even fewer publications on the impact of competency-based education on student success, completion rates and employability.

## Examples

Many communities and countries face shortages of skilled workers and some countries address this through the development of educational programs or through increased salaries to fill available demand (OECD, 2013). Despite the economic crisis of recent years and high unemployment, many employers are still not finding qualified staff to fill the vacancies, though effort of the public-private partnership in vocational-educational training (VET) in some countries helps address this (OECD, 2013). Will this be enough of a driver to widen the available options for earning a degree?

Recognizing the need for college and career readiness against the realities of rising student loan debt and unqualified workforce, and supported nationally by large philanthropic organizations like The Bill and Melinda Gates Foundation, the United States has led the exploration of competency-based education models (Gates

Foundation, 2013). With recent acknowledgement from policy makers in the United States, further exploration is supported at both the state and federal level (Pace, 2013).

The following examples stem from higher education environments in the United States, though secondary cases are on the rise<sup>2</sup>

Western Governors University (WGU) employs a fully online, self-paced, regionally accredited, competency-based model of higher education allowing students to accelerate and progress as they are able to do so (WGU, 2013a). Degree programs are defined through subject specific councils and online learning resources, including OER, are provided to support the competencies evaluated in formative and summative assessments. Student and course mentors support students through their degree program by viewing analytic dashboards providing student engagement and progress reports (WGU, 2013c).

Southern New Hampshire University recently launched College for America as a response to the workforce crisis in America (SNHU, 2013). Although US federal law was enacted in 2006 recognizing learning beyond seat-time to a broader acceptance of “direct assessment” of student learning based on the competency-based model at WGU, College for America is the first institution to tap into the Higher Education Act (Field, 2013).

The University of Wisconsin launched their Flexible Option program in a directed effort to support adult and nontraditional students. Moving from a seat time model to a competency model, the program supports progress through assessment of prior knowledge. Coach advisers will help students understand which competencies are needed to complete their degree and resources are provided to encourage learning in areas needing direction and support. This fully self-paced model will launch in September 2013 and will allow students to gain competence through MOOCs offered through other universities and other online resources (University of Wisconsin, 2013).

These are just examples of ways three different institutions are addressing the need to better prepare the students for transition to the job market. In these cases, competency-based education is preparing students for life beyond the degree. WGU is reporting positive outcomes in measurement of higher order thinking skills, critical thinking and written communication (WGU, 2013b).

2. <http://knowledgeworks.org/high-school-race-top> and <http://www.csmonitor.com/USA/Education/2013/0509/In-Texas-Obama-lauds-New-Tech-high-school.-Model-forthe-future-video>

## Exploration for European context

Exploration of a competency-based model for Europe needs a systemic understanding of what framework would make a marked difference within or beyond the objectives of the Bologna Process. What existing infrastructure could align with the introduction of new models of education? Does a competency-based model fit solidly within the Europe 2020 strategy for growth and jobs? Or is it part of the Vocational Education and Training initiatives? The model could certainly be limited to one category and developed within a European context under this premise, however competency-based education has potential to offer more value to both students and state.

Defined qualifications and specific competencies paired with an integration of higher order thinking skills that help the transition from education to employment are only some of many considerations of developing a new educational model. A critical reflection of delivering degree programs in a new way may lead to a competency-based model balancing between traditional degree programs and vocational programs.

The idea of a degree based on qualifications, competencies and duration (QC&D) offers a holistic approach to education to meet the ever-changing economic environment. By blending competency-based approaches with duration models as well as modularity with fully integrated programs, one begins to see the possible opportunities the European Higher Education Area might offer (Bacsich, 2013).

Some of the highlights of this recommendation include normalized qualifications that are directly aligned with the hiring requirements of the market and undergraduate degree programs that include core competencies and standardized capstone requirements. Additionally, formative assessments that are dispersed throughout the program in the form of automated, peer- and team-feedback will become the norm and will help to ensure successful completion of summative assessments.

There is not one single model of competency-based education or technology enhanced learning to simply unpack and deploy. As effective as that might be, cultural differences, regional policy and existing frameworks are all factors that could either facilitate or hinder consideration and adoption of new models of education.

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## Sintesi

*Il continuo mutamento delle esigenze del mondo del lavoro e l'evoluzione tecnologica impongono l'adeguamento degli obiettivi della formazione sia pre- sia post-universitaria e specialistica. Numerosi studi - tra i quali, nel 2013, un'indagine della fondazione americana intitolata a Bill e Melinda Gates - hanno analizzato i modelli didattici adottati dalle università americane che si avvalgono delle nuove tecnologie di comunicazione in rete, confermando le ricadute positive dell'applicazione della tecnologia all'educazione superiore nell'area statunitense. L'apprendimento del futuro, inteso come "competency based learning" implica il rafforzamento delle competenze degli studenti in maniera esplicita e misurabile, nella forma dei learning object; una nuova concezione della fase di valutazione delle competenze, che deve essere un momento di proficua e positiva crescita dello studente; l'adozione di modelli formativi adattabili ai modi e agli stili di apprendimento di ciascuno studente; il sostegno alla creazione di conoscenza e non solo al suo trasferimento. In questo quadro, che non si riferisce esclusivamente alla formazione mediata dalle tecnologie, va notato come queste ultime abbiano un potenziale importante sul piano della flessibilità dello studio, soprattutto grazie alle forme di monitoraggio delle attività e alla valutazione in itinere degli studenti. A livello europeo, gli obiettivi complessivi del sistema formativo devono orientarsi con forza verso la piena normalizzazione e armonizzazione delle qualifiche culturali e professionali con i requisiti del mercato del lavoro, nonché alla standardizzazione delle competenze nei corsi undergraduate. In aggiunta, è auspicabile sviluppare ulteriormente gli strumenti di autovalutazione formale, sia attraverso applicazioni automatizzate sia mediante peer-team-feedback, utili sia per la valutazione dell'efficacia dell'apprendimento, sia per lo sviluppo di comunità didattiche di condivisione delle conoscenze.*